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ABSTRACT

This volume discusses some of the language-related factors involved in bilingual education. The first paper surveys the major results and current research topics in the field of syntax, with an emphasis on how they might be of relevance to bilingual education. The first part of the article gives an overview on the nature of the field of syntax, and discusses the field in terms of language typology and language universals. Among other topics that are discussed are variation studies, syntactic change, and the relationship of morphology and syntax. Proposed research is then outlined. The second article outlines the area of semantics, relating it to pragmatics and bilingual education. An overview is then given of cultural, lexical, structural, epistemological, and logical studies in an attempt to reconcile their methods with linguistic studies in dealing with bilingual education. The final article presents a view of the linguistic tasks which children undertake during the first five years of life, and aims to provide a general view of the language skills a child brings to language instruction in the primary years. (Author/PJM)

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PAPERS IN APPLIED LINGUISTICS

Bilingual Education Series: 7

Language Development, Grammar, and Semantics: The Contribution of Linguistics to Bilingual Education

by Arnold M. Zwicky
Robert N. Kantor
John M. Lawler
Deborah Keller-Cohen

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Introduction

This volume discusses some of the language-related factors involved in bilingual education. The three papers presented here are among those originally given at the Bilingual Symposium: Building a Linguistic Research Agenda in Bilingual Education, which was held in conjunction with the 1975 Winter Meeting of the Linguistic Society of America. All three papers have been extensively revised and updated for publication in this volume.

The articles by Zwicky and Kantor and Lawler provide a view of syntax and semantics for the nonlinguist and make suggestions and comments concerning the relevance of these insights to bilingual education. Keller-Cohen's article explores how children begin to gain linguistic competence in these areas of language. The aim here is to give a thorough overview of trends in syntactic and semantic research, with annotations addressed to those interested in the applicability of such research to a bilingual classroom environment.

The authors' discussions of possible applications of linguistic findings to bilingual education tend to emphasize teaching and learning a second language--usually English. This is not because the authors believe that teaching English as a second language (ESL) necessarily is, or should be, the primary function of education, but rather because ESL instruction is the area in which the contributions of linguistics are presently most obvious and direct. Research on other communicative situations in the classroom, for example the syntactic, semantic, and pragmatic factors involved in such activities as telling or requesting students to perform particular tasks, is available. But the translation from linguistic theory to educational practice in these areas is still more hypothetical than actual.

Because of the interdependence of linguistic components, the line between semantics and pragmatics has been drawn in many different places, and there is currently no uniformity of opinion concerning which phenomena observable in language are properly the object of study in each field. What Lawler subsumes under semantics, for example, includes much more than the logician's study of the truth value of propositions; in fact, it goes beyond even the interactions of meaningful elements to include matters of human interactions and communication which are sometimes considered to be within the realm of pragmatics.

Similarly, Zwicky and Kantor's survey of syntax is appropriately broad, including discussion not only of generalizations about sentence constructions but also of morphological and discourse-level phenomena, as well as the relationships among these levels of structure, and the influence of semantic and pragmatic factors on the structural characteristics of language.

Keller-Cohen draws together some of the concerns discussed in the other articles. Her purpose is to highlight many of the linguistic tasks which children undertake during their first five years of language acquisition. She concentrates in particular on the linguistic skills that are the focus of language instruction in the primary grades. The discussion functions as a guide for teachers of young children who are learning English as their first or second language.

A Survey of Syntax*

Arnold M. Zwicky
Robert N. Kantor

INTRODUCTION

In the following pages we survey the major results and current research topics in the field of syntax, with an eye to those that might be of relevance to bilingual education. We have deliberately chosen to think about "relevance" in a very broad sense, deeming both direct and indirect, immediate and longer-term, applications to be of interest. It is also true that we come to the topic as theoreticians in linguistics exploring new territory, rather than as practitioners in education, but we hope that our approach will help readers to see familiar topics from a new direction or in a fresh light and to think about some unfamiliar topics that might be of use in the design and implementation of multilingual programs.

THE FIELD OF SYNTAX

The Nature of Syntax

Basics. The field of syntax, in its broadest sense, concerns the ways in which *meaningful elements are combined in language*. All languages associate *sounds* with *meanings* in units that have characteristic *uses* (by particular people in particular situations). There are branches of linguistics that treat each of these aspects of language: *phonology*, the study of the way sounds are used in languages; *semantics*, the study of the meanings conveyed by these sounds; and *pragmatics*, the study of the uses of specific sound-meaning combinations.

But it would be wrong to conceive of a language as a gigantic list of stretches of sound, each combination conveying a specific meaning and appropriate for use in certain situations. Such a "language" would be far too inflexible for the number and variety of things that people want to do by speaking: it would be enormously burdensome to produce and perceive, since speaking and understanding it would require memorizing vast numbers of long stretches of sound, with their accompanying meanings and uses. And such a language would fail to take advantage of the creativity of speakers and listeners--their ability to concoct and understand novel combinations of a limited number of elements.

In fact, languages are organized into units at several levels, and at each level units are combined according to general principles rather than idiosyncratically. As a result, new combinations can be made and understood. For instance, there are general principles of word formation in English that allow us to form, and understand, the plural of a word even when we have had no previous experience with this plural. I can talk about persimmons, and you will understand me, even if our previous experience with the English language does not happen to have involved the word persimmons; it is enough that we know the word persimmon and the general principles for making plurals.

*We would like to thank Mary Jo Hood for her help in preparing the first version of this paper; John Perkins for his helpful comments on that version; the other speakers at the 1975 Bilingual Symposium, where this paper was first presented, for their discussion of many important points; and the official discussants for our paper at the symposium, Rosaura Sanchez and Gustavo Gonzales, for their comments, which we have tried to respond to in revising our presentation for publication.

Levels of structure. It is customary to distinguish three major levels of organization of meaningful units in languages. The smallest meaningful units, *morphemes*, are combinations of sounds like the un, happy, ness, and es in the word unhappinesses. Morphemes combine to form *words*, according to principles peculiar to each language. Only certain *combinations* are possible--happy can be joined with ness but not with es--and even then the morphemes must be combined in a specific *order*, happiness, not *nesshappy.[1] Finally, the principles of combination often refer to whole *classes* of morphemes, rather than to specific morphemes: once you know that straightforward is an adjective meaning so-and-so, you can form, and understand, the noun straightforwardness. The general principle concerning words with ness in English can be summarized (leaving out a few details) in a formula:

Adjective + ness = Noun

The principles of word structure, then, taken together, are known technically as the *morphology* of a language.

The second major level of organization is *syntax* proper, the organization of words into larger units, i.e. *sentences*. Again, only certain combinations are possible--Weeds flourished, but not *Weeds of--and even when a combination is possible, it must usually be made in a certain order--Weeds flourished, not *Flourished weeds. Again, the principles of combination often refer to classes of words rather than to specific words; once you know that cinquefoils is a noun meaning so-and-so and that thrived is a verb meaning so-and-so, then you can form, and understand, the sentence Cinquefoils thrived.[2]

Finally, sentences can be assembled into still larger units, *discourses*, again according to general principles. For instance, Once upon a time there was a very happy king is one way to begin a certain type of discourse in English, but not to end one, and this sentence could be followed by He ruled with a firm hand but not by She ruled with a firm hand. The principles of organization at this level are known as the *discourse structure* of the language. Discourse structure, like morphology and syntax, shows restrictions on combination and order, and makes reference to general classes of units.

Although the three levels of organization seem in many ways to be governed by general principles of distinct types, there are many important interrelationships and parallels among levels. For instance, the same or similar meaning can be expressed either morphologically or syntactically--likelier or more likely, visited or used to visit, Roger's or of Roger; the same or similar meaning can be expressed by a sentence or by a sentence fragment--What did you see? (I saw) A dog with a pink bow around its neck;[3] and the same or similar meaning can be expressed in one sentence or several--Arriving home, we noticed a peculiar smell or We arrived home. We noticed a smell. It was peculiar. A parallel between levels can be seen in the fact that morphological classes typically play a role at all three levels; thus, the Noun-Verb-Adjective-Adverb distinction in English will be referred to in the principles that have to do with morphology, syntax, *and* discourse structure. Because of such interrelationships and parallels, our discussion below touches on all three areas, though the focus is on syntax proper.

Syntactic research. Linguists approach the field of syntax in a number of different ways. We distinguish here three major lines of approach; the first two are of special interest to bilingual education.

Analysis of specific languages or language varieties. Much effort is directed toward describing the syntax of English, French, Mandarin, Navajo, and so on, the aim being to unearth the general principles at work in each language, to provide a detailed account of the way the language works, and to do this efficiently and insightfully. These studies may concern a regional or social variety other than the literary standard (if there is a literary standard), or they may concern informal rather than formal styles; each variety and style has a system of its own. Very often language-specific studies suggest hypotheses about linguistic universals or theoretical proposals (these notions will be discussed below), and very often the direction of research on a specific language variety is suggested by crosslinguistic studies or by theoretical hypotheses.

Crosslinguistic studies. Another very fruitful line of research compares parallel structures in a wide variety of languages, with the goals of establishing *linguistic universals* (propositions that are true for all languages) and discovering useful *typologies* (groupings of languages into a few types or classes on the basis of salient features). For instance, the systems of personal pronouns can be compared, or the ways of asking questions, or the ordering of verb, subject, and direct object. Almost invariably it turns out that the systems that occur are not all the logically possible ones, and such limitations lead investigators to propose universals and typologies. These hypotheses in turn motivate the search for confirmation and counterexamples in other languages and suggest revisions of theory.

Theory construction. Theoretical studies in linguistics are aimed at specifying, precisely and in detail, what the form of language is, and at explaining, insofar as is possible, why a language should have the form it does. Syntactic theory provides terminology and formalism for the description of syntactic structure, as well as many hypotheses about the sorts of syntactic structures that are possible. The theoretical framework an investigator uses guides him towards certain phenomena (and away from others). Our interest in theory, here, comes from the fact that theoretical proposals may suggest unexpected connections between different aspects of a language or between aspects of different languages.

Relevance of Syntactic Theory to Bilingual Education

There are various ways in which more theoretical, or abstract, studies can have relevance to more practical, or applied, matters. Possible applications sometimes directly motivate certain lines of research; at other times applications spring indirectly, even in totally unexpected ways, from research carried on for other purposes or, perhaps, simply for its own sake. In looking at the relevance of syntactic research to bilingual education, it is easy to see that some sorts of research have fairly direct relevance, while others can be applied only indirectly. A study of the syntax of a local variety of a language, for example, might be used quite directly by someone writing classroom materials. On the other hand, research on the general nature of syntactic variation can reasonably be expected to have only more indirect use--perhaps providing insight into some aspect of language use in the classroom that could help increase the sensitivity of those involved in bilingual education to linguistic factors in the situation. Such indirect application is, we feel, more significant than it might sound, since nonspecialists often seriously underestimate both the complexity of language structure and its regularity; this misunderstanding of the nature of language itself can confound practical problem-solving and even mask the existence of genuine problems.

It is also true that there is no such thing as relevance in the abstract: what is relevant is relevant to someone, for some purpose. In considering bilingual education, we see at least seven groups with differing potential interests in the fruits of linguistic research: *(a)* the parents of the children concerned; *(b)* teachers (other than language teachers) and teacher aides in a bilingual setting; *(c)* teachers of a language as a subject; *(d)* curriculum planners; *(e)* designers of classroom materials; *(f)* testers and evaluators; *(g)* teachers of those in groups *(b)* and *(c)* above. We have not tried systematically to label our comments as being of special interest to one or more of these groups, though we have given some suggestions.

With these preliminaries out of the way, we turn now to a general statement about some ways in which syntactic research might be relevant to bilingual education; the final section of this article presents a more specific discussion.

Language influence. The primary relevance of syntactic research to bilingual education is in the analysis of the influence of the student's first language (L_1) on the next language(s) (L_2) he learns, and of the second on the first. This influence can range from extensive, but essentially innocuous, *borrowings* (individual words phonologically adapted, translations of idiomatic phrases) all the way to the total overwhelming of one language by another. We are concerned here with the intermediate degrees of influence that can be expected in a bilingual setting. The most obvious form of influence is *interference*, the carrying-over of patterns from one language into another--as when a Spanish-English bilingual says Aquí están

unos trapos 'Here there are some rags,' (with estar 'to be'), instead of the standard Aquí hay unos trapos (with haber 'to have'), presumably because English uses be rather than have in such a construction (Cohen 1975:191); or says Another one is sitting in the wall instead of the standard on the wall, presumably because Spanish en corresponds to both in and on in English (Cohen 1975:200-1).

A more complex form of influence between languages is *simplification*, in which contact between languages results in a system that is simpler than that of either of the contributing languages. Lehiste (1965:66-8) examines a very striking case of syntactic simplification: contact between Estonian, with 28 distinct forms for every noun, and Baltic German, with eight distinct forms for every noun, resulted in some speakers having only two distinct noun forms in their "mixed" variety.

Notice that it will sometimes be hard to tell the difference between interference and simplification. This will be so, for example, when interference would naturally reduce a system, as when English, with two forms for each noun, is in contact with a language with more, like German or Russian. The extent of simplification, then, in situations where bilingualism has been or is being established could easily be underestimated and interpreted simply as interference.

In addition, Cohen (1975:Ch. 8) points out that interference must be distinguished from at least two other sorts of deviations from "school" grammar. Certain "errors" may be attributable to the fact that a child passes through predictable stages in *language acquisition*. Moreover, if the student is still developing competence in his mother tongue, the task of learning a second language simultaneously may be made more complex. Other "errors" may actually be forms characteristic of *nonstandard dialects* of the L_2 spoken by the student's peers. To this list we must add *hypercorrect* forms (like Cohen's example The cat are going to stay, with incorrect are presumably brought about by too much effort, conscious or unconscious, to use are in the right places) and genuine *speech errors* of the sort that even competent adult monolinguals make from time to time (as in Take off your chair and pull up a coat).

Finally, first and second language learners will sometimes simply (and often unconsciously) avoid troublesome words or constructions. Thus, speakers of French or Italian might avoid using actual in English because French actuel and Italian attuale mean 'current, recent' rather than 'real, true.' Learners of English tend to avoid relative clause constructions in favor of conjunction with and: instead of I noticed a book that I wanted to buy, they will use the syntactically simpler I noticed a book, and I wanted to buy it. Indeed, avoidance may well be an important factor in syntactic simplification: learners will avoid more complex constructions, because they are likely to sound inept and "foreign," in favor of simpler, safer constructions.

One linguistic goal of bilingual education might be that the students have command of two coexistent language systems which do not influence each other. However, interference and simplification, and perhaps avoidance, in both of the speaker's languages are inevitable, especially in the early stages of second language learning. We would like to be able to do the following: *(a)* To predict the nature of this influence, given the structures of the two languages involved and the strategies used in second language learning both before and after the "critical age." *(b)* To assess the significance of specific instances of influence: How much do they retard communication? Will they pass away spontaneously in a short time? Are there strong attitudes towards some of these aspects of L_1 and L_2? *(c)* To determine whether particular effects of influence can be alleviated by direct or indirect help from a teacher, and if so, what the best strategy for help would be. Syntactic research bears especially on points *(a)* and *(c)*.

There is a substantial literature on the subject of interference in second language learning based on contrastive analysis (Lado 1957) and, more recently, based on error analysis (Dulay and Burt 1972; Burt and Kiparsky 1972). But much research remains to be done, especially on language learning in the relatively natural settings of bilingual classrooms. It seems to us that this research is important regardless of the instructional approach being used to establish skills in two languages (see Engle 1975 on the direct and native language approaches).

Styles and varieties of language. It is important that not only language teachers but all classroom teachers involved in bilingual education appreciate the complexity of the language learning task confronting their students: the L_2 spoken by fellow students will be an informal style, probably of a regional and social

variety different from the literary standard, but the L_2 the students are expected to read and write will probably be a formal style of a variety approaching the literary standard. The students are then faced with a double task--learning to speak and understand one version of L_2, but learning to read and write another. If the students are being taught by the native language approach, they have a triple task--learning to read and write "standard" L_1, learning to speak and understand "colloquial" L_2, and learning to read and write "standard" L_2. On a purely practical level, it might be sensible to cut down on the number of different tasks imposed on the students at least at first, through the use of materials in colloquial varieties of both L_1 and L_2, and through forebearance on the part of the teacher towards the use of colloquial L_2 in the classroom.

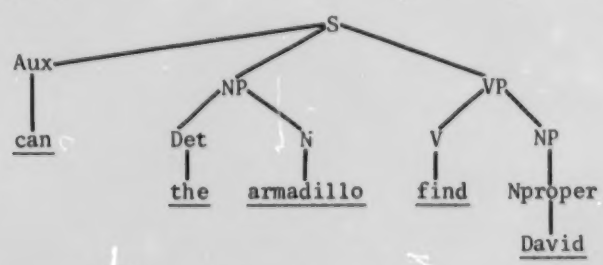
Studies of interference phenomena will need to be based on the styles and varieties of the languages actually used, not on an abstract standard with which the student has little or no contact. Although the syntax of various regional and social varieties of English, and some other languages has been described in some detail, many varieties have scarcely been touched. In addition, the study of the syntax of informal styles[4] has barely begun (see Silva and Zwicky 1975 for some examples). Both areas are relevant to bilingual education and need further study.

General implications of theoretically oriented work. It is obviously advantageous to someone examining any sort of learning to understand the nature of the thing being learned. And different conceptions of what is being learned--for example, language--lead to quite different conceptions of the learning process and of the most effective teaching strategies.

In the case of syntax, it was believed for many years that an adequate description of the syntactic structure of a language would take the form of a list of all the types of phrases in the language. For English such a list might include principles like the following:[5]

(i)	NP + Aux + VP = S	(declarative pattern)
(ii)	Aux + NP + VP = S	(pattern for yes-no questions)
(iii)	VP = S	(imperative pattern)
(iv)	V + NP = VP	(transitive verbs)
(v)	V = VP	(intransitive verbs)
(vi)	be + NP = VP	(predicate nominals)
(vii)	be + AP = VP	(predicate adjectives)
(viii)	Det + N = NP	(phrases like the armadillo)
(ix)	Pro = NP	(pronouns)
(x)	Nproper = NP	(proper nouns)

A sentence like Can the armadillo find David? would be seen as involving principles (ii), (iv), (viii), and (x), and the *phrase structure* of the sentence could be displayed as in the diagram below:



From this point of view it might be assumed that the learning of syntax is largely a matter of learning the patterns expressed by principles like (i)-(x). Second language texts based on this theoretical framework focused on differences in the patterns displayed by different languages.

However, theoretical studies during the last 20 years indicate that a much more complex approach is required. First, it has been suggested that the syntactic description of a language should be *transformational*, in the sense used by Chomsky (1957): certain phrase structures are assumed to be basic and others are derived

from these by a series of *transformations*--operations that insert material, delete elements, or rearrange the existing elements. In the example above, the phrase structure for Can the armadillo find David? will be derived from a structure much like the one for The armadillo can find David by a rule that interchanges the subject NP (the armadillo, in this example) and the Aux (can, in this example).

Second, there should be a tightly constrained theory about what sorts of phrase structures and transformations languages can have. Such a theory should incorporate findings on linguistic universals and typologies. For instance, the theory should incorporate the observation that while some languages, including English, form yes-no questions by means of a transformation interchanging the subject NP and the Aux (as in the "armadillo" example above), no language has been observed to form yes-no questions by interchanging the subject NP and the direct object NP.

Third, systematic variation--for instance, regularly occuring differences between the syntax of formal and informal styles--should be understood as part of the structure of the language, to be described in as much detail and with as much attention to general principles as any other aspect. For instance, the fact that sentences with missing initial elements, like You want to go or Want to go for Do you want to go are informal in style and are derived by a deletion transformation conditioned by the stylistic level chosen by the speaker, as well as by the syntactic categories of the elements involved.

These three changes in the way syntax has been viewed utterly transform the way learning is seen by linguists, and future advances in theoretical matters will doubtless have a similar impact on practical enterprises. Hence, even theoretical work of a highly abstract variety must be seen as possibly relevant to activities like bilingual education.

CURRENT RESEARCH IN SYNTAX OF INTEREST TO BILINGUAL EDUCATION

Syntactic studies of interest to those in bilingual education fall into a number of categories: *(a)* Studies concerned with language typology and universals; *(b)* those examining functional considerations in language structure and use; *(c)* those dealing with the three interface areas (between syntax and morphology, between morphology/syntax and semantics, and between syntax and pragmatics); *(d)* those concerned with syntactic variation; and *(e)* those studying syntactic change. In the sections that follow we discuss current research in each of the categories and comment on its relevance to bilingual education.

Typology and Universals

Typology. Languages can be sorted into types using such varying criteria as *genetic relationship*, as when we speak of Germanic or Romance languages; *geographic relationship*, as when we speak of Baltic languages or American Indian languages in the U.S.; or --and most pertinent to our discussion--*shared properties of the linguistic systems* themselves. Such groupings are called *typologies*, and these usually divide the languages of the world into only a few major groups. The concern relevant to bilingual education is: Will a language learner, speaking a language of one typological class, have more difficulty learning a language of another class than learning one of the same class? And if so, what kinds of difficulty?

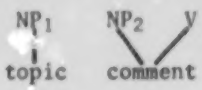
One often-discussed typological classification is that of the *order of major sentence constituents*--subject (S), verb (V), and direct object (O). Greenberg (1963b) notes that in the vast majority of languages the dominant word order is SVO, SOV, or VSO. He proposes a number of universal implications based on these order types, among them: "Languages with dominant VSO order are always prepositional....With overwhelmingly greater than chance frequency, languages with normal SOV order are postpositional (Greenberg 1963:61)." For instance, Thai, a VSO language, has prepositional phrases, such as bon tôl (literally 'on table') 'on the table.' whereas Navajo, a SOV language, has postpositions, for example, tsi-yi' (literally 'woods in') 'in the woods.'

Vennemann (1974:366) cites Hoenigswald's suggestion that sentence accent patterns characteristically differ according to whether the language is verb-final (SOV) or

not. In languages that are, the assignment of stress is *primary-secondary* (as in English White House). For languages that are consistently verb-nonfinal, the accent pattern is *secondary-primary* (as in English white house). According to Vennemann, this difference causes "a major difficulty in learning a language of the opposite type of one's native language...." Such observations are well worthy of more investigation by those concerned with second language learning.

Lehmann (1973) finds that the placement of function words like articles, prepositions, and conjunctions, as well as the type of morphology that a language displays,[6] are related to word order type.

Word order typology may be overlain, or at least modified, by another style of sentence organization, according to recent work by Li and Thompson (1976). They argue that the notion *topic* plays a role in the syntactic organization of sentences in some languages of the world, including, for example, the Sino-Tibetan languages Chinese, Lahu, and Lisu. Such languages are best described as having a basic sentence structure as in



where NP_1, the topic, has a number of properties not possessed by subjects. A striking example is the Lisu sentence

làma	nya	ńnà	kyù - a
'tiger'	(topic marker)	'dog'	'bite' - (declarative marker)

which apparently is perfectly ambiguous between the readings 'tigers (topic), they bite dogs' and 'tigers (topic), dogs bite them.' Discourse context will determine which meaning is intended. Li and Thompson claim that the notion of *subject* of a sentence is not a universal of language and that the underlying form of the basic propositional types of certain languages may be quite different. This difference between subject prominence and topic prominence may be of crucial importance for the teaching of a language of one type to speakers of a language of a different type.

Perlmutter (1971) suggests another typological differentiation on the basis of whether or not a language requires a *surface subject*.[7] Compare Italian sono or io sono 'I am' with French je suis but not *suis 'I am.' This distinction appears in a variety of contexts in which a subject must appear, not only in simple sentences but in constructions like relative clauses and complements. It would be useful to catalog further typological distinctions of phenomena of such prominence as subjects within a language.

Universals of language. Typically underlying typologies, such as the word order typology discussed above, are *language universals*, properties of language which are realized in all languages of the world. Thus, the word order typology is established under the assumption that all languages have subjects, objects, and verbs. Similarly, we can say that all languages have nouns. While this universal is obvious to anyone who has studied languages, some useful applications follow from it. For example, we can proceed to contrast the noun systems of languages of the world to see what more specific and insightful statements we can make about them. This universal also allows us to exploit a speaker's (largely unconscious) knowledge of the noun system of his language, to bring it to consciousness, and to contrast it with the noun systems in languages he is attempting to learn.

Linguists have only begun to discover the many language universals which surely exist, but some findings already display their potential usefulness to bilingual education. We present below a few of the morphological and syntactic phenomena that are known to be universal, with comments about how they might be applied to that field. Some of the relevant source materials are also noted.[8]

Propositional types. An almost uncontroversial universal is that all languages have *propositional types* expressing certain meanings. For example:

Equational: Percy is a policeman.
Existential: There was once a king.
Transactional: Helen gave the pencil to Irene.

Each language expresses these propositional types according to its own syntactic means, and an inventory of these types and their syntactic realizations in each language would be useful for predicting interference problems and for developing a language curriculum.

An excellent source for discussion of propositional types is the *Stanford Working Papers on Language Universals*, including works by Clark (1970) treating universals of and relationships between existential, locative, and possessive constructions; Blansitt (1973) on transactional clauses; and Bhat (1975) on the syntactic distinctions between existential and equational sentences. Dowty (1972) presents an enlightening view of the difference between verbs describing activities and those describing states.

Sentence types. It is also an unrestricted universal that all languages have *sentence types*--distinct syntactic constructions which have characteristic uses. Probably all languages distinguish at least three sentence types:

Declarative: Penguins cannot fly.
Interrogative: Can penguins fly?
Which birds cannot fly?
Imperative: Fly away, you penguins!

The *Suggestion* type (Let's go fishing. Why not have another fish cake?) and the *Exclamation* type (How tall you've gotten! What a triumph that was!) are common but perhaps not universal. For any given sentence *use* (requesting, informing, commanding, suggesting, etc.) the range of sentence *types* found in languages is quite small; there is only a handful of ways to ask yes-no questions, for instance. Such facts about sentence types and their uses could be fruitfully exploited in language teaching in a bilingual setting. Published studies include Moravcsik (1971b) on yes-no questions, Elliott (1971) on exclamatory sentences, and Pope (1973) on answers to questions.

Nouns and noun modifiers. All languages have nouns. However, the syntactic and semantic features associated with nouns and the types of modifiers (and their syntactic realizations) associated with nouns may again differ greatly from language to language. For example, features like case, number, and gender may be totally absent in a language or may be present to varying degrees. Students whose languages lack the features found in English will be particularly prone to underdifferentiate those English features; for instance, a student whose language does not have an overt marker for the plural will frequently fail to add the s to English nouns.

Types of noun modifiers will also differ. Considerable time will have to be spent, for example, teaching the different uses of the English definite and indefinite articles to students whose native language has none.

On the other hand, any similarities between languages should be exploited. We expect languages to show adjectival modifications, numerals, genitive (possessive) relationships, and so on. The syntactic realizations of many of these features are well described in the literature, and awareness of them should be useful to language teachers, curriculum planners, and those designing classroom materials.

Moravcsik (1969) treats the observation that the notion of definiteness is realized in some languages by word order and in others by such noun modifiers as articles (and in some languages by tone!). Ultan (1970) presents a typology of possessive constructions. Moravcsik (1971a) characterizes agreement features and treats in particular gender, number, person, and definiteness. Greenberg (1972) treats the properties of numeral phrases modifying nouns.

Function words. Languages differ greatly in their inventories of the "minor" or *function word* categories, for example whether or not they have prepositions, postpositions, articles, classifiers, intensifiers, copulas, verb auxiliaries, negation markers, and coordinating conjunctions. Further, meanings associated with function word categories in one language may be associated with "major" or *content*

word categories in another: in some languages, meanings like 'with' and 'for,' and even 'not' and 'and,' are expressed by words with the syntactic properties of verbs. Function words in English (as well as all other languages) are frequent in speech and writing, and their improper use immediately marks a speaker as foreign or uneducated. Comparative syntactic research into the distribution and uses of function words could provide much useful material for curriculum development and materials design.

Relationship of nouns to verbs. The ways nouns are related to verbs--as subjects, direct objects, indirect objects, and so on--differ greatly from language to language, and even within a language from verb to verb. Since these differences in *case systems* can be a major source of interference, contrastive and error analyses will be very important.

Fillmore (1968) presents an analysis of the syntactic reflexes of a semantic notion of case, an analysis which has served as a model for many language descriptions. Traditional grammars of individual languages typically contain sections on the various uses of grammatical case. Lees (1970) shows how noun-noun compounds in English systematically reflect the relationships of nouns to verbs.

Complements: a case of relationship between syntax and semantics. We saw above that each language has its own syntactic means of expressing propositional types. Similarly, languages have different ways of expressing relations between propositions, or modifications of propositions.

We find, for example, that verbs fall into semantic classes which constrain syntactic operations; these classifications have to do with the *complements* (clauses acting as subject or object) of the verbs. Thus, verbs have been semantically classified by Kiparsky and Kiparsky (1970) as being *factive*--those whose complements are presumed to be true; for instance, realize in

(1) Lisa realizes that ostriches cannot fly.

or *nonfactive*--the complements of which are not presumed true; for instance hint in

(2) Leroy hinted that New York was about to default.

Hooper (1975) finds that these factive and nonfactive verbs are cross-cut semantically by another semantic distinction--*assertive* versus *nonassertive*. Assertive verbs like hint or realize indicate in one manner or another that the speaker or the subject of the sentence has an affirmative opinion regarding the truth value of the complement [as in (1) and (2) above], while nonassertive verbs comment on or deny this truth value: be possible (nonfactive) and regret (factive) in (3) and (4) are nonassertive:

(3) It is possible that Harry has thrown out the leftover squid soufflé.
(4) I regret that your monkey has caught cold.

These semantic distinctions turn out to have syntactic reflexes: we find that a nonassertive factive can contain the phrase the fact that, while an assertive factive cannot.

(5) Bill regretted the fact that Sue had won the Pulitzer Prize.
(6) *Bill realized the fact that Sue had won the Pulitzer Prize.

Objects of assertive verbs can be preposed (moved to the front of the sentence), whereas objects of nonassertive verbs cannot be.

(7) Mary is lost, Bill hinted.
(8) *Mary is lost, it's unlikely.
(9) Mary was lost, John realized.
(10) *Mary was lost, John regretted.

These are just two semantic distinctions with syntactic correlates. We believe that such classes as factive, nonfactive, assertive, nonassertive, and others

are universal. If the language learner is made conscious of such classes, language learning might begin to seem less random and idiosyncratic.

A wealth of information on the syntax of subordinate clauses in many languages is contained in Corum et al. (1973). Zwicky (1974) surveys work done on direct and indirect discourse, syntactic realizations of which may differ dramatically.

Adverbial connectives. All languages have syntactic devices for relating two propositions with respect to

Time, precedence, simultaneity:	After/Before/When John left, Sue showed up.
Concession:	Although John's not here I think you can go ahead without his signature.
Reason:	I did it because I wanted to.
Purpose:	I'm doing this now so that I can leave later.

and more. All languages will express these relationships syntactically but in different manners.

Quirk et al. (1972) present a breakdown of English adverbial connectives, as well as most of the major syntactic constructions in English. Geis (1970) provides syntactic analyses of English time adverbial clauses, and also (1973) gives analyses of *if* and *unless* clauses. Rutherford (1970) distinguishes two types of reason clauses--those modifying the speech act, as in *Dory's here, because I can hear him*, and those that are part of the main proposition, as in *Dory's here because he wants to be here*. Speech act concessives, as in *I hate to bother you, but your zipper is open*, are analyzed by Baker (1975) and Kantor (1975b).

Other universals. The discussion above presents only some of the syntactic universals that linguists have studied. There appear to be, in fact, very few language-particular phenomena if one probes deeply enough.

Functional Considerations[9]

In our opening discussion of syntax, we argued that a "language" that associated stretches of sound directly to meanings would be too inflexible for use in human activities, and that this *functional* consideration explained the multi-level organization of languages. In particular, we noted that the burden on perception and production was lightened by the existence of meaningful units smaller than a whole discourse--sentences, words, and morphemes. The organization of sentences into *phrases* of various sizes can also be seen as motivated by functional considerations: these are meaningful units intermediate in size between the word and the sentence.

The need for processable "chunks" of language elements of various sizes explains why there are meaningful units smaller than a whole discourse; it does not, of course, explain why languages have particular units. If we ask why languages have transformations, we can again reply with functional arguments--and again, these will explain why transformations of various sorts exist, but not why languages have the particular transformations they do. McNeill (1966:62), for example, examining children's acquisition of negation in English, hypothesizes that the development of transformational rules for the placement of the negative comes about because "the child needs to process sentences in short intervals of time; presumably it takes less time and a child tends to forget less when the placement of the negative is done by transformational rules rather than by independent [phrase structure] rules," but must appeal to specific linguistic universals to explain why the acquisitional sequence takes the shape it does. We must keep in mind, then, that functional considerations help explain many universal properties of language, but not all of these properties, and none of them completely.

With this caution, we now turn to six ends served by transformations: *(a)* the marking of sentence types, *(b)* the marking of relationships in discourse, *(c)* pronounceability, *(d)* perceptibility, *(e)* brevity, and *(f)* variety. It should be remembered that these functions of transformations are unrestricted universals of language. That is, we expect all languages have these same functional needs, though they are satisfied by language-particular transformations and conditions on transformations.

Marking of sentence types. Every language must provide some systematic indication of sentence use. This may be done by characteristic pitch patterns associated with particular uses, like the rising final pitch of questions in English, as in You're going now? and Are you going now?; by special morphemes or words associated with particular uses, as in the use of how come to indicate a question and let's to indicate a suggestion; by deletion transformations, as in the *test question* The discoverer of the mudpack treatment for arthritis was...? and in the *imperative* Get me a beer!; by transformations changing word order, as in the *yes-no question* Will the penguin bite me? and the *wh-question* Who will the penguin bite?; by transformations copying parts of sentences, as in the *tag question* You're happy, aren't you? and the *tag request* Give me a metric wrench, would you?; or by combinations of several of these devices, as in some of the examples already given.

In addition to these direct indications of sentence use, every language has a number of conventionalized indirect forms, like the English Do you have any roasting chickens?, which has the form of a question but is conventionally used as a request for a shopkeeper to get roasting chickens for you (if he has any). We return to these indirect forms in our discussions below of the relationships of morphology, syntax, and semantics. Here we should remark that such utterances can fairly be called *speech act idioms* (Sadock 1972)--entire sentences whose function in speech is different from the use normally associated with their sentence type--and like other idioms, they do not translate easily into another language. So just as by and large cannot be translated into *por y grande in Spanish, *par et grand in French, or *von und gross in German, so a literal translation of Do you have any roasting chickens into Hebrew does not appear to yield the expected response from Hebrew-speaking storekeepers, and none of the following (from Sadock 1974a:93) counts as a normal request to open the door in English, though each does in the original language:

Swedish: *Tänk om Ni skulle opna dörren.*
'Think whether you should open the door.'

Hebrew: *atâ muxân liftoâx et hadêlet?*
'Are you ready to open the door?'

Greenlandic Eskimo: *matumik angmarniarit.*
'May you try to open the door!'

In such idioms we have a rich potential source of misunderstanding between speakers of different languages.

Marking of discourse relationships. A sentence in a discourse must bear meaningful relationship to what preceded it; it must fit semantically and pragmatically. But we find also that sentences in context are syntactically constrained. For example, it is often said that active and passive sentences have the same meaning, yet in a discourse, one form may be clearly preferable,[10] as in the example:

(11) Bill was touring Columbus. *The whole city was seen by him in a day.

Here the passive sentence sounds somewhat odd. On the other hand, a passive sentence is appropriate in a context like the following:

(12) Guess what happened to Jim. He was just given the Congressional Medal of Dishonor by a group of anti-war activists.

Why should a passive sentence be preferable in one context and not in another? Firbas (1971) maintains that all languages have mechanisms whereby information that is old to the discourse or known to the hearer will come first in a sentence, and newer information will come towards the end. Different languages will accomplish this information distribution in different ways. A language like Czech, with an extensive set of morphemes attached to nouns indicating their relationship to the verb, may simply rearrange word order, while a language like English must use different syntactic structures, such as the passive.

Other linguists also maintain that linguistic elements and structures reflect *communicative functions.* Kantor (1977), for example, has suggested that a speaker of

a language has a special knowledge of the communicative abilities of his addressee, and on the basis of this knowledge, he decides the application of rules for pronominalization, definite reference, use of various connective devices such as conjunctions and adverbs, and so on. Kuno (1972) categorizes four types of declarative sentences, each with different discourse functions and concomitant syntactic constraints (see also Chafe 1976 and Freedle 1977).

Teachers of composition must frequently grapple with questions like the following: How do you emphasize something? How do you make a smooth transition from one topic to another? How do you indicate the beginnings and ends of sections? Different languages accomplish these functions in different ways, and a great deal of research remains to be done on what communicative functions there are and on the syntactic means by which they are accomplished.

Pronounceability. It is the function of phonological rules of assimilation and neutralization to make sequences of sound more pronounceable. In morphology and syntax, pronounceability is served in at least two ways -by principles imposing order on elements and by principles avoiding certain difficult combinations of elements.

Ordering. A recurrent proposal in syntactic studies (beginning with Staal 1967 and including Vennemann 1973) is that the constituents of a phrase in basic phrase structure are not ordered with respect to one another, but are placed in their appropriate linear order by transformations. According to this proposal, English and Japanese would have the same phrase structure rules with the same meanings, for instance:

{NP, VP} = S
{V, NP} = VP

In both English and Japanese, the constituents of S would be ordered NP, VP, but in Japanese a transformation would order NP before V within VP, while in English a transformation would order V before NP within VP. One function of such transformations is literally to make sentences utterable. As Miller and Chomsky (1963:483) put it: "Subjectively, we seem to grasp meanings as integrated wholes, yet it is not often that we can express a whole thought by a single sound or a single word. Before they can be communicated, ideas must be analyzed and represented by sequences of symbols." [Emphasis added.]

Whether or not we assume that basic phrase structures lack linear order, there will still be transformations providing alternative orders for certain constituents. All of these transformations primarily provide variety (see the discussion of variety below), though they serve other functions as well. Three examples: the rule of Particle Movement, which derives (14) from something like (13);

(13) I gave up meat for Lent.
(14) I gave meat up for Lent.

the rule of Cleft Sentence Formation, which derives (16) from something like (15);

(15) Jack noticed a penguin.
(16) It was a penguin that Jack noticed.

the rule of Negative Lowering, which derives (18) from something like (17).

(17) It is not so that pigs can fly.
(18) Pigs cannot fly.

Cleft Sentence Formation also serves a discourse function, since it focuses on one constituent in a sentence. And Negative Lowering also works for brevity, since it reduces a two-clause structure to a single clause.

Finally, it seems that not all ordering is accomplished by phrase structure rules and transformations. Beginning with Ross (1967) and Perlmutter (1970, 1971), a great many *surface structure constraints* (SSCs) have been proposed, among them a number concerned with the ordering of elements within words and sentences. SSCs are (static) *conditions* on structures, rather than (dynamic) transformations. Perlmutter

argues that the ordering of pronouns before the verb in Spanish (first se, then second-person pronouns like te, followed by first-person pronouns like me, then third-person pronouns like le) should be stated as a SSC rather than the outcome of a set of ordering transformations.

A possible example from English (though the arguments for a SSC here have not been laid out anywhere) is the ordering of elements in the verbal auxiliary: first a modal, then the perfect have, then the progressive be, then the passive be (all together in the awkward They might have been being beaten).

The distinction between ordering accomplished by transformations and order conditions expressed by SSCs might have important implications for second language learning, since the former relates to universal characteristics, while the SSCs appear to be idiosyncratic and language-particular. We might then expect learning of SSCs to be more difficult and to result in interference or avoidance.

Difficult combinations. One striking type of syntactic combination that causes difficulties in production[11] is the repetition of morphemes with identical or near-identical pronunciations, as in the English sentence I was surprised that that man came, or in examples with two verb -ing forms in sequence (Ross 1972c), like *He has been trying washing every car that came his way. There is no universal constraint against such sequences, since they are often tolerated--notice the two dos in Do do something quick! However, they tend to be disfavored, especially when one or both of the morphemes lack stress.[12]

Languages adopt several strategies for avoiding such difficult combinations. One strategy is simply to prohibit them, by means of a SSC, as in the case of double -ing constructions in English. Note, however, that there is an alternative construction for conveying the meaning: He has been trying to wash every car that came his way.

A second strategy is to use a transformation that reduces the two offending elements to one. Radford (1977) gives examples in Japanese, English, Swedish, Hindi, Mandarin, and Polish, as well as the following French illustration: *Je préfère que tu restes, plutôt que que tu t'en ailles 'I prefer that you remain than that you go away' becomes Je préfère que tu restes, plutôt que tu t'en ailles, with the deletion of que 'that.'

A third strategy is to use a transformation that converts the offending sequence to one with different elements. Radford gives examples in Serbo-Croatian and French, and the following German case: *Goethe ist bekannter als Schriftsteller als als Naturwissenschaftler 'Goethe is better known as a writer than as a natural scientist' becomes Goethe ist bekannter als Schriftsteller denn als Naturwissenschaftler, with denn replacing als 'than' (although it cannot replace als elsewhere).

We can expect such constructions to present difficulty to the language learner, since he has no way of knowing which sequences are offensive in L_2 or how the offense is treated--whether the sequence is simply prohibited, so that an alternative construction must be found, or whether it is reduced, or whether a special substitution is made for one element.

Perceptibility. We have already noted that the chunking of language material, into words, phrases, sentences, and discourses, aids perception (and production as well). Pauses, pitches, and other phonological phenomena that "demarcate" boundaries (Trubetzkoy 1969) make these units even clearer. Some transformations also aid perception by encoding larger units as smaller ones, much as encoding a binary number like 1001110 into an octal number, 116, makes it easier to perceive and recall; transformations of this sort are treated in the discussion of brevity below.

There are at least two other ways in which transformations, or conditions on transformations, serve perceptibility: some transformations provide redundancy to sentences, and some transformations and conditions on them prevent perceptual complexity. We give some examples in the following two subsections.

Redundancy. In the technical sense, *redundancy* is not a bad thing; it refers to those elements in communication that could be eliminated without loss of information but which are present to help ensure comprehension. Numerous writers (for instance, Chao 1968:205-6) have pointed out that both written and spoken language need considerable redundancy, since the conditions of communication by language are never perfect (there are background noises, speakers make slips of the tongue or

speak with their mouths full of food, listeners are inattentive or hard of hearing). Any extra information provided in language helps listeners to perceive correctly under these less-than-perfect conditions. Transformations of two types supply redundancy: *government rules* and *agreement rules*.

Government rules require that a word take a special form when it occurs in a specific construction. For example:

(a) Object pronouns in English undergo transformation resulting in special forms, so that in We admire her, the fact that the subject is we and the object is she is indicated both by the ordering of the words in the sentence and also by the special form for objects, her.

(b) Verbs following the perfect auxiliary have take the past participial ending, so that in They have seen everything, the fact that the sentence has perfect aspect is indicated both by the auxiliary have and by the special form for past participles, seen.

(c) A NP preceding and modifying a noun takes the possessive ending 's, so that in your father's mustache, the fact that the NP your father modifies mustache is indicated both by its ordering before mustache and by the ending 's.

Agreement rules ensure that the form of one word agrees with some property of another word. Some English examples:

(a) A verb in the present tense takes the third-person singular ending s when its subject is a third-person singular NP, so that in He admires them, the fact that the subject is he and the object is they is indicated in three ways: ordering, the object form them, and the s ending agreeing with the subject but not the object.

(b) The modifiers this and that agree in number with the nouns they modify, so that in these monkeys, the fact that monkeys is plural is indicated in two ways: by the ending s and by the form these instead of this.

(c) In some dialects, indefinite pronouns agree in negativity with a preceding not, so that in They didn't see nobody nowhere, the negativity of the sentence is indicated in three places: by n't, by nobody instead of anybody, and by nowhere instead of anywhere.

Avoiding perceptual complexity. Yngve (1960, 1961) suggested that one motivation for the existence of certain transformations is that they reduce the degree of what we might call "heaviness on the left:" they move wordy constructions from positions relatively early in the sentence to the end of the sentence, thereby reducing the processing load on the listener, since the rest of the sentence will have been processed. The idea is developed further in Langendoen (1970). Among the English transformations with this effect are the following:

Extraposition: That he was a spy for the Ruritanians surprised us all. ⇒ It surprised us all that he was a spy for the Ruritanians.

Extraposition from NP: A man who was wearing a penguin suit came in. ⇒ A man came in who was wearing a penguin suit.

Heavy NP Shift: They gave the two proposals that they all felt were the best of the lot to Sharon. ⇒ They gave to Sharon the two proposals that they all felt were the best of the lot.

Passive: Every single person who had ever had the experience of passing through the Department of Anaerobic Bacteria hated Professor Smurd. ⇒ Professor Smurd was hated by every single person who had ever had the experience of passing through the Department of Anaerobic Bacteria.

(Notice that perceptibility is the primary function of Extraposition and Heavy NP

Shift, while Passive is primarily motivated by discourse considerations.)

In some cases, perceptual complexity is averted by a condition on a transformation. For instance, Particle Movement is blocked from applying where there is a complicated direct object; compare:

(19) I gave up all foods that contained more than 0.1% animal fat.
(20) *I gave all foods that contained more than 0.1% animal fat up.

The matter of perceptual complexity has also been explored in detail by Grosu (1972), building on the work of Bever (1970). Grosu discusses four sorts of difficulties that are alleviated by transformations or averted by conditions on them: erroneous closure, interrupted behavior, perceptual conflict, and unacceptable ambiguity. We now take these up briefly in turn.

Erroneous closure, or "being led up the garden path," occurs when it is possible to understand the beginning of a sentence as a complete sentence; the listener then "closes off" too soon and is puzzled by the remainder of the sentence. Erroneous closure explains why the That-Deletion transformation (I believed that the earth was flat ⟹ I believed the earth was flat) does not apply to subject clauses; if applied to a sentence like That Tom dislikes koala bears is odd, the result, *Tom dislikes koala bears is odd, leads the hearer up the garden path, since Tom dislikes koala bears is a sentence in itself. Similarly, erroneous closure can be used to explain why the transformation Relative Pronoun Deletion (A man whom I don't like complained about the proposal ⟹ A man I don't like complained about the proposal) does not delete relative pronouns representing the subject of the relative clause, as in A man who got up complained about the proposal: the result, *A man got up complained about the proposal, begins with a complete sentence, A man got up.[13]

Interrupted behavior occurs when the processing of one unit is broken up in order to allow processing of another unit of the same sort. Interruption is very burdensome perceptually, and this undesirable complexity explains why, for example, there is a limit to the number of relative clauses which can be nested one within another.

(21)a The school fired the teacher.
b The teacher the school fired flunked the girl.
c ?The girl the teacher the school fired flunked cried about her grades.
d *The grades the girl the teacher the school fired flunked cried about were abysmal.

Perceptual conflict occurs when the conditions on two transformations cannot be reconciled. It can be illustrated by the example *Diana was stabbed by herself, which attempts to apply both the Passive and Reflexivization transformations. However, as Grosu (1972) argues, the Passive transformation changes the focus of a sentence, but Reflexivization can apply only when two NPs refer to the same thing. How, then, could Passive change the focus of the example in which the subject and object refer to the same person?

A final matter of perceptual complexity is *unacceptable ambiguity*[14] referring to ambiguities that are in some sense intolerable to speakers of the language. To illustrate, consider the fact that the transformation Pronominalization is blocked from applying in the sentence (22) below and in the discourse (23):

(22) Gerald and Nelson strode into the room, and
{Gerald / Nelson / *he} began berating the reporters.

(23) Has Margaret spoken to Mildred about the impending bankruptcy?
Yes, and {Margaret's / Mildred's / *her} mother was most upset.

The result of the transformation is ungrammatical, presumably because it is impossible to tell who he and her refer to. Other examples of unacceptable ambiguity are a bit more subtle. In (25) below, the relative clause who was pregnant modifies girl. Since this straightforward interpretation is available, (25) cannot be understood as having who was pregnant modify a woman, an interpretation that would be possible if the transformation Extraposition from NP could move the relative clause in (24) to the end of the sentence.

(24) A woman who was pregnant hit a girl.
(25) A woman hit a girl who was pregnant.

Examples of this sort have been treated in detail by Hankamer (1973) and Ruwet (1973), each proposing a universal constraint against particular kinds of ambiguities.

In connection with unacceptable ambiguity, we must emphasize that most ambiguity is acceptable, in the sense that having more than one meaning does not in general cause sentences to be judged ungrammatical or impossible. Indeed, practically all sentences have more than one meaning, out of context, if only because so many words have more than one meaning: in the sentence the pen is hot, pen has at least three meanings ('writing implement,' 'enclosure for animals,' 'penitentiary') and hot at least two ('high in temperature,' 'stolen'), so that out of context the sentence has at least six distinct meanings. Even ambiguities introduced by transformations are usually innocuous: I like Sam better than Harry has two meanings ('I like Sam better than I like Harry,' 'I like Sam better than Harry likes Sam'), but the sentence is not impossible, as sentences (22) and (23) above are.

Since languages have considerably different morphologies and rather different sets of transformations (as well as varying ambiguities in individual words), the effect of (even universal) constraints against ambiguity will not be the same in all languages. Other sorts of perceptual motivations for rules and conditions will also have different manifestations in different languages. Moreover, some languages seem more willing to accept perceptual complexity in particular parts of their grammar than other languages.

Brevity. A further functional consideration in human communication is that it must take place on a time scale suited to human beings, that is, a very wide range of complex messages should be communicable in no more than a few seconds. Nothing we have said so far would guarantee this. The requirements that language be pronounceable and perceptible and that sentence types and discourse relationships be marked could be satisfied by giving a unique phonological realization to each piece of semantic and pragmatic structure.[15] But the result would not be a usable language. Phonological deletions and coalescences would reduce the length of discourses somewhat, but they would still be far too long. Three sorts of transformations abbreviate discourses so as to make them usable: Deletions and Pro-ings, transformations reducing clause structure, and the insertion of lexical items. We take these up one by one in the subsections that follow.

Deletions and pro-ings under identity. Some transformations abbreviate sentences and discourses by eliminating repeated references or descriptions (by Deletion under identity) or by replacing them by fixed short forms (by Pro-ing).

Some examples of deletion transformations in English are Conjunction Reduction, which derives (27) from (26)

(26) Apples are red and apples are juicy.
(27) Apples are red and juicy.

Gapping, which derives (29) from (28)

(28) George ate a bagel and Chuck ate some sushi.
(29) George ate a bagel and Chuck some sushi.

and several other rules illustrated in the previous sections--Comparative Deletion, in I like Sam better than Harry, That-Deletion, and Relative Pronoun Deletion. Deletion rules in discourse yield sentence fragments like those discussed by Morgan (1973):

(30) What do you think Janet uses that butter for?
I suppose (Janet uses that butter) for greasing pigs.

Pro-ing transformations in English include two rules illustrated in the previous section, Pronominalization and Reflexivization, plus transformations yielding instances of one, do so, and so plus auxiliary:

(31) Barbara observed a blue Egyptian cross-hatched bullbat, and Brutus noticed a red Egyptian cross-hatched bullbat. ⟹ Barbara observed a blue Egyptian cross-hatched bullbat, and Brutus noticed a red one.
(32) I completely consumed a bucket of oysters in two minutes, and Max completely consumed a bucket of oysters in two minutes, too. ⟹ I completely consumed a bucket of oysters in two minutes, and Max did so, too.
(33) My wife is going to Vienna next year, and I am going to Vienna next year. ⟹ My wife is going to Vienna next year, and so am I.

Reduction of clause structure. Other transformations compact two clauses into one. Negative Lowering is one such rule. Also in this set in English are transformations reducing clauses to phrases, like the rules of Raising, Equi-NP Deletion, Gerundive Nominalization, and Abstract Nominalization, illustrated in (34)-(37) respectively:

(34) I believe that she is a spy. ⟹ I believe her to be a spy.
(35) I expect that I will break the bank at Monte Carlo. ⟹ I expect to break the bank at Monte Carlo.
(36) That Max eats so much vichyssoise amazes me. ⟹ Max's eating so much vichyssoise amazes me.
(37) For Zelda to transform Hugh into a toad took six hours. ⟹ Zelda's transformation of Hugh into a toad took six hours.

An important effect of clause reduction rules is that they may result in ambiguous phrases, because clauses of many distinct structures are compacted into a few phrase types. Simple illustrations of this compacting can be seen in ambiguous sentences like He saw her duck, where her duck can be either a basic NP or a basic clause, she ducked, reduced to a NP her duck.

Other interesting examples of the effect of clause reduction rules come from what might be called the *favorite phrase structures* in particular languages (also known as *syntactic targets*, as in Haiman 1974). At the level of the word, English is especially rich in noun-noun compounds like snowman, iceman, graph paper, rag paper, horse thief, kiddy car, girl friend; these represent a large variety of semantic relationships, discussed in detail by Lees (1960). Chinese is rich in subject-predicate compounds, illustrated by combinations translatable as "day brightens" for 'dawn,' "the sea screams" for 'tidal wave,' "the breath pants" for 'asthma,' and "male fades" for 'impotence' (Chao 1968:Sec. 6.2). At the sentence level, English has numerous VP constructions of the form V NP Adj, among them the following (from Green 1970):

(38) I found him dead.
(39) She painted the house red.
(40) She painted it sober.
(41) They buried her alive.[16]

Insertion of lexical items. A complete description of the syntax of a language must include not only a list of the smallest units, the morphemes, and a set of principles for combining units at each level into units at the next, but a list of words like redcap, throughout, dog-eared, bagpipe, and once-over, whose meanings are not composed from the meanings of their constituent morphemes by general principles of the language. It must also include a list of phrases like by and large, give up, rain cats and dogs, on the sly, be about to, yours truly, and you can say that again, whose meanings are not composed from the meanings of their constituent words and phrases by general principles of the language. Such items are termed *idioms*, and these, coupled with individual morphemes, are sometimes called *lexical items*. An

easy, but important, part of language learning is the learning of its lexical items, from the morphemes on up to idiomatic sentences.

We assume here the view of the *generative semanticists* (see the section on compositional semantics below) that lexical items replace more complex structures, by a special sort of transformation. In any case, lexical items can stand for quite elaborate meanings--that is, a few morphemes can represent a good deal more.

Variety. Yet another function of transformations is to provide alternative forms for sentences. We have already given numerous examples of transformations which allow the same or similar meaning to be presented in syntactically different forms: the transformations Passive, Particle Movement, Cleft Sentence Formation, Negative Lowering, Extraposition, Extraposition from NP, Pronominalization, That-Deletion, Relative Pronoun Deletion, Raising, Equi-NP Deletion, Conjunction Reduction, Gapping, and others. It is also true that languages abound in lexical items with the same or nearly the same meaning: die, expire, pass away, kick the bucket; huge, gigantic, enormous, great; and many other sets. There seems to be a marked tendency towards a profusion of ways to convey the same meaning--towards variety for its own sake. In some areas of the vocabulary, this profusion is enormous--Wentworth and Flexner (1967:652-4) take up nearly two pages listing synonyms for drunk in English--and the variety of paraphrases provided by transformations is great.

The tendency towards variety is opposed by another tendency in language that there be "no distinction without a difference." Pure variety is unstable: differences in form tend to be seen as corresponding to differences in meaning, or at least (like differences in pronunciation) to be understood as conveying differences in stylistic level or regional or social dialect. Because of this tendency towards differentiation, some linguists (for instance, Chafe 1970:86-90 and Bolinger 1975) have maintained that identity of meaning is much rarer than scholars have generally supposed.

The semantic and social differentiation of distinct forms presents special problems in language learning and language teaching. The teacher obviously must be aware of whatever differentiations in cognitive and social meanings are present in the student's first language. Furthermore, studies of syntactic variation show considerable variability within a language group from person to person, and the same is true for lexical items. One has only to question a group of Americans about what sofas, couches, and davenports are to realize how much individual variation there can be in the meanings assigned to particular words. Teachers should be aware of instances when syntactic constructions or lexical items might show this sort of individual differentiation, and should probably not attempt to legislate invariant usages for such items.

The Relationship between Syntax and Morphology

We have already pointed out that the same or similar content can sometimes be expressed syntactically and sometimes morphologically--sometimes *analytically*, through the juxtaposition of words and use of auxiliary verbs, for example, and sometimes *synthetically*, using inflectional prefixes and suffixes. Languages differ considerably in how they exercise these options. Thus, where English uses the modal auxiliary will or the construction be going to to indicate future tense (and has no morphological form for the future), French has special verb forms like (il) chantera 'he will sing,' as well as the syntactic construction in (il) va chanter 'he is going to sing.' And where some other languages have *dubitative* and *reportive* forms of verbs, English must use syntactic constructions--the adverb maybe or perhaps in combination with the verb for the dubitative, and a two-clause construction with I hear that..., Someone told me that..., or something of the sort for the reportive. Differences of this sort between languages cause interference in language learning, and lead to the use of simplified forms, often with analytic constructions replacing synthetic ones.

An important area of current research concerns language elements on the borderline between syntax and morphology--*clitic* (literally 'leaning') elements, like the Spanish pronouns te, me, le mentioned above in connection with surface structure constraints, or the English contracted auxiliary verbs 's, 'd, 've, 'll, 'm, 're. Clitics are subordinated in stress to other words and usually show phonological reductions, often of an idiosyncratic sort.

Of special interest to us here is that clitics show many syntactic peculiarities. The ordering of a clitic with respect to the word to which it is attached may be different from the ordering of a related nonclitic form; in French, object NPs follow the verb, but clitic pronoun objects come before the verb (Je vois Jean 'I see John,' but Je le vois 'I see him'). Clitics may be attached to whatever word happens to be next to them, whether that word is semantically or syntactically related to the clitic word, as in the case of the English clitic auxiliaries. Or the clitics may all move to one place in the sentence, the most common locations being with the verb, at the end of the sentence, or after the first word of the sentence.[17] Finally, there are extremely complex conditions on when elements must, may, or cannot become clitics. One such condition on the contraction of auxiliaries in English is discussed by King (1970), who attacks the problem of why contraction is permitted in sentences like The concert's in Royce Hall tonight, but not (for many speakers) in sentences like *Tell me where the concert's tonight. Further conditions on contraction of auxiliaries are treated by Zwicky (1970) and Labov (1972).[18]

In any event, the conditions on cliticization and the principles governing the placement of clitics are likely to be stumbling blocks in language learning. Interference and avoidance may well be most extreme when the languages in question have similar, but not identical, patterns of cliticization and clitic placement (as in the case of French, Italian, and Spanish). Also, there are often considerable dialect differences in the placement of clitics, and teachers may need to be aware of them.

The Relationship between Morphology/Syntax and Semantics

Form and function. It has long been realized that the connection between *form* and *function* in language is exceedingly complex.[19] To begin with, even the smallest meaningful units, the morphemes, have more than one phonological form; the English plural morpheme, for instance, has one pronunciation in cats, another in dogs, another in churches, another in men, another in oxen, and so on. This is only the beginning of the complexity, since a single morpheme can be used to convey a number of distinct (though related) bits of meaning, and the same meaning can be conveyed by a number of distinct morphemes. For example, the English past tense morpheme has among its functions reference to past time, but it can also refer to the present time in "unreal" situations, as in I wish I knew. And it can refer to future time, as in It's time you went to bed. On the other hand, the past tense morpheme is not the only way to signal past time in English. This can be accomplished by using a perfect form--I have seen Austria; or a present form, in the so-called historical present of colloquial English--So he says to me...; or the modal would--I would often see him walking across campus; or with the used to construction--She used to be fretful.

This disparity between form and function can be found at every level of grammar, from the morphological on up. It can be seen, for example, in the meanings associated with the syntactic classes Noun, Verb, Adjective--many nouns are the "names of persons, places, or things," but some are not; in They took a walk and We avoided his grasp, the nouns walk and grasp describe acts; in rural policeman and solar battery the adjectives rural and solar do not describe states but name a place and a thing, respectively. At the level of the whole sentence, we observe that declarative sentences are not invariably used to make statements, interrogative sentences to ask questions, or imperative sentences to request or command: the interrogative sentence Would you pass the salt? makes a request, as does the declarative sentence I'd like the salt, while the imperative sentence Add salt, and the solution will turn blue makes a statement, not a request.

For each of these examples we should point out that there are certain standard or normal associations between form and function: the normal use of the past tense is for past time reference (which is why the tense is called *past* and not, say, *recent*); the normal use of nouns is to refer to persons, places, and things (which is why the class is called *noun*, from Latin nomen 'name,' and not, say, *state*);[21] and the normal use of imperative sentences is to make requests and commands (which is why the sentence type is called *imperative*, from Latin imperare 'to order, command,' and not, say, *declarative*). These standard associations can be exploited in language learning in an obvious way, as can some of the exceptional associations which recur in language after language (the historical present, for instance, and the use of a declaration of wish or desire to convey a request). The learner has no assurance, however, that the language he is learning has these exceptional associations; many are quite arbitrary and therefore constitute learning difficulties.

Compositional semantics. The previous section concerned the way in which meanings are associated with individual elements at various levels of linguistic structure. But an account of the relationship between morphology/syntax and semantics requires not only an association of elements with meanings but also an account of how the meanings of larger units are composed of the meanings of their parts. This apparently simple-sounding issue has led to what is undoubtedly the hottest current controversy in syntactic theory and has generated an enormous amount of literature, some concerned with polemics, some with theory construction, and some with language description.

In our opening discussion of syntax, we suggested that the great diversity of constructions that occur in a language is derived from a much smaller set of structures (the basic phrase structures for that language) by means of transformations. Now, when we ask how meanings of larger structures are composed of the meanings of smaller ones, we have to decide which structures we are talking about--the *actual* (or *surface*) phrase structures of sentences, or the *basic* (or *deep*) phrase structures, some intermediate creatures, or some combination of these. The position of Chomsky (1965) was that semantic interpretation works only on basic structures. Indeed, one argument for positing such basic structures in the first place was that they made more clear the semantic relationships among the parts of sentences. Exactly the opposite assumption was made by the philosopher Montague (see the papers collected in Montague 1974, and Thomason's introduction to the volume); from this point of view the principles of compositional semantics are seen as working with the surface phrase structures, and transformational analysis is not necessary. A mixed approach has also been advocated (Chomsky 1970): both surface and basic structures figure in semantic interpretation. A detailed presentation of a mixed system is given in Jackendoff (1972).

Note that linguists' approaches to semantic interpretation all use basic structures in some way. It is, then, natural to ask what the difference is between basic structures and representations of meaning, since basic structures are in many ways closer to the semantic relationships in sentences than surface structures are. The proposal that basic structures are the representations of semantics has come to be known as *generative semantics* (see, for example, the expositions in Lakoff 1971a and McCawley 1973), while the proposal that the basic structures are different from the representations of semantics has come to be called *interpre(ta)tive semantics* (Chomsky 1970). These issues have been hotly debated, largely on technical matters of little interest to our present discussion. However, there is at least one topic of importance here--the semantic basis of syntactic phenomena, a topic we have noted several times already.

Many transformations, like the rule of Raising, apply only to certain forms--We believed Adolf to be a spy, but not *We thought Adolf to be a spy, although both We believed that Adolf was a spy and We thought that Adolf was a spy are possible. Is this purely a matter of syntax, or is there a semantic basis for the difference in behavior between believe and think? Interpretive semanticists are inclined to see syntactic structure as largely independent of semantics, while generative semanticists see syntactic structure as following from semantics. There are clear implications for language learning in this debate. If the interpretive semanticists are right, the learner is faced with the task of mastering two parallel systems and the principles governing their interrelationship. If the generative semanticists are right, the learner must master one basic system (semantics) plus the principles realizing this system syntactically (the transformations). A very interesting exploration of the generative semanticists' proposal in this regard is made in a work by Green (1974). Here, an all-out effort is made to find a semantic characterization of the verbs permitting one transformation in English (Dative Movement, which relates I gave the chart to her and I gave her the chart). Green succeeds, but only by characterizing a number of distinct classes of verbs permitting the rule; she concludes that there are several transformations working towards what we called a favorite phrase structure. We cannot predict from general principles exactly which classes of verbs permit the rule: Green does not demonstrate that there is any intrinsic connection between the semantics of these verbs and the fact that they can undergo Dative Movement. Further, there is variation from speaker to speaker as to which verbs permit the rule. But her results suggest that more use could be made of semantic properties in teaching the grammar of a second language along the lines of statements like "verbs of desire take both ut and the infinitive" in traditional grammars, though not necessarily as rules to be learned by the students.

The Relationship between Syntax and Pragmatics

The performative analysis. In early transformational grammars, sentence type was not specifically represented in basic structures, so that imperative and interrogative sentences were derived by transformations from declarative sentences. In slightly later work, abstract markers like *Q* (for *question*) and *I* (for *imperative*) triggered the relevant transformations. Ross (1970) and Sadock (1969) proposed still later that every sentence has a basic structure in which the surface content of the sentence is the object in a structure of the form I VERB (to) you _____. That is, the declarative sentence She is tall would have a basic structure roughly like I declare to you that she is tall, while the interrogative sentence What is life would have a basic structure roughly like I ask you what life is. This analysis has been called the *performative analysis*, because it takes as basic certain sentences like those Austin (1962) termed *performative*. Such sentences "perform" an action rather than make a statement that could be judged as true or false; I hereby pronounce you man and wife is a paradigm performative sentence. The analysis has been the subject of some controversy.

The major line of support for the performative analysis comes from parallels between the syntax of a particular sentence type and the syntax of clauses subordinate to verbs of speaking appropriate to that sentence type. In the case of imperatives, for instance, the similarities are between main imperative sentences like Please move your camels and clauses subordinate to verbs of requesting or commanding, as in I request you to please move your camels. Crosslinguistic aspects of these similarities are surveyed in Farwell (1972). In general, it can be said that the parallels are considerable.

Indirect speech acts. The analysis of a sentence whose use is not directly related to its form has been a matter of much discussion; several of the contending proposals are surveyed in Sadock (1974: Ch. 4). The central issue is whether the indirect uses of sentences can be predicted in a general way from their direct uses. We might, for instance, argue that since it is reasonable to request someone to do something only if he is able to do it, we can suggest that he do it by asking if he is able to. By such a chain of argument we could conclude that, in general, it is possible to get the effect of requesting someone to do something by asking him if he is able, so that Can you move closer gets the effect of Please move closer. Reasoning like this explains why sentences can get the effects they do, but it does not explain why certain indirect forms seem to succeed without any particular calculation on the part of the speaker or hearer (Would you pass the butter is simply one way of requesting the butter in English). We suggested above that such forms have become idioms and therefore must be memorized in learning a language.

Linguistic theory and pragmatics. Morgan (1975) argues for a view of language, in contrast to the views of generative and interpretive semantics, in which the language learner is faced with the task of mastering the communicative function of linguistic elements. That is, for example, one should not speak of the semantics or truth conditions of the definite article the. Rather, the definite determiner is seen as signalling something about the real world of the speaker (hence *pragmatics*)--the speaker's intention that the hearer pick out an intended referent or make inferences about the speaker's beliefs concerning the intended referent. The language learner, then, must acquire the functions of certain lexical items and syntactic rules and constraints, rather than their meanings.

Variation Studies

Individual variation. Recent studies in syntax have shown the existence of dialects --systematic variations of syntactic features among groups of speakers. These groups of speakers are not always bound by geographical location or social or ethnic identifications. Indeed, we may find that members of the same household vary in their language use with respect to some syntactic/semantic feature.

For example, Carden (1970) finds that there are three major dialects with respect to the interpretation of sentences like (42).

(42) All the boys didn't leave.

Some speakers of English interpret sentence (42) as meaning only

(43)a [Not all] the boys left.

That is, the word not is interpreted as negating the quantifier all as shown by the brackets in (43a). This dialect is known as the NEG-Q dialect. However, there are other speakers of English who understand (42) as meaning only (43b).

(43)b All of the boys [didn't leave.] = (None of the boys left.) = (All of the boys stayed.)

Here, the negative element is associated with the verb. Speakers who understand sentence (42) in this way are said to speak the NEG-V dialect. Yet a third group of speakers find sentence (42) to be ambiguous; both (43a) and (43b) are possible interpretations. Such speakers are said to speak the AMB dialect. If a teacher, then, says to the class,

(44) All of you aren't behaving.

how will an individual student interpret this statement--as a chastisement of himself, or of others in the class who are misbehaving? There are, in addition, many potential instances when a teacher might correct a student's language use when in fact the student and teacher have conflicting dialects with respect to a particular syntactic feature.

Implicational relationships. Ross, in a number of articles (1972b, 1973a, 1973b), tackles the interesting problem of what it means for an element to belong to a syntactic category or class. One of the great virtues of transformational grammar has been its ability to characterize higher-order constituents, that is, to show that not only is a proper noun like John a noun phrase (NP), but so also is something as complex as a relative clause, as in the boy who gave me the book, or nominals like John's breathing too deeply, or even for-to complements like for John to leave. Note that all of these NPs can be used as the subject of a sentence:

(45)a Max upset Jim.
b The boy who gave me the book upset Jim.
c Max's breathing too deeply upset Jim.
d For Max to leave upset Jim.

Note, however, that in another syntactic frame only some of these NPs yield grammatical sentences:

(46)a I believe Max to have upset Jim.
b I believe the boy who gave me the book to have upset Jim.
c ?I believe Max's breathing too deeply to have upset Jim.
d *I believe for Max to leave to have upset Jim.

The reader may find sentence (46c) here to be perfectly grammatical. In fact, according to Ross, individual speakers will vary in their judgments of the grammaticality of an individual sentence. However, any time a speaker accepts as grammatical a sentence like (46d), in which a for-to phrase functions as an NP, he will accept all nominals of the type in (46c). There is an *implicational relationship* in English that says proper nouns, as in (45a), are more "noun phrasy" than nominals, which in turn are more noun phrasy than for-to complements. Speakers of a language will not violate the noun-phrasiness hierarchy, although they may differ individually about a cut-off point for any particular syntactic frame. These *squishes*, as Ross calls his hierarchies, have been shown to exist for a wide range of syntactic categories and syntactic frames, and indeed can explain why the grammaticality of some sentences may be disputed by two speakers of the same language.

Keenan and Comrie (1977) discuss another kind of implicational relationship, one which they posit as a universal. They set up a case hierarchy

SUBJECT ≥ DIRECT OBJECT ≥ INDIRECT OBJECT ≥ OBLIQUE ≥ GENITIVE ≥ OBJECT OF COMPARISON

and assert that if a langauge can form a relative clause on a noun in one position, it can form a relative clause on nouns in all positions above that one. Thus, English can form relatives on genitives, as in the boy whose mother I saw, and, by the implicational universal, on oblique objects (the man from whom I received a letter), and so on up the hierarchy to subjects (the girl who hit Bill). Other languages may be able to form relatives only on subjects and on no other position. Interestingly, this case hierarchy has been shown by Keenan (1975) to reflect differences between syntactically simple literary style and more complex style: authors judged to use a simple style--George Orwell, for example--relativize much more heavily on subjects, while authors like Virginia Woolf, who are judged to use syntactically more complex sentences, have a greater percentage of non-subject relative clauses. Hierarchies such as the one shown here might be useful, then, both for predicting interference problems in second language learning and for evaluating the level of acquisition of different syntactic structures.

Patching. Morgan (1972:285) notes that the rule of subject-verb agreement in English is learned "as a relatively simple principle, but fails to extend to complex cases." Consider, for example:

(47) (Either) Harry or his parents $\left\{\begin{matrix}\text{is}\\\text{are}\end{matrix}\right\}$ coming.

Some speakers will accept only is, some accept only are, some accept either, some reject both, and others cannot make any kind of judgment. Morgan suggests that different speakers will treat such constructions by adding new subsidiary principles to their grammars in an idiosyncratic fashion. He believes that, faced with a construction like (47), a speaker will *patch* his grammar in some way, or sometimes fail to patch and decide that the sentence cannot be said. It would be useful for a teacher to know where the rules of a language fall through in this way. Appeals to "logic," translations from other languages, textbook rules, or the teacher's own speech are likely to be unconvincing to the students in such instances; teachers should probably simply tolerate alternative usages.

Specific styles. In addition to variation from person to person, dialect to dialect, and language to language, there is variation from situation to situation. The analysis of specific styles, with examples from conversation, newspaper writing, legal documents, and other sources, is considered in some detail by Crystal and Davy (1969). Other specific styles are easily isolated--the style of scientific writing, the style of recipes and labels (Sadock 1974a), the style of newspaper headlines, the style of children's rhymes and taunts, and others. School children, in both monolingual and bilingual environments, are expected to become facile users of a number of specific styles, although the task is often not presented to them in this light. Teachers should be aware, at least in a general way, of their own stylistic repertoires, their students' repertoires, and the styles they want the students to use in various school situations. Since there are substantial syntactic differences between styles, teachers should also understand the nature of these differences.

Syntactic Change

Typically, when languages come into contact, they will influence one another. We might even expect to find differences in language use within an age group, depending upon how much contact any particular child has had with a second language while learning his native language. While we have already noted the importance of examining the dialects of the languages spoken, it is important to note further that languages and dialects may be (and almost certainly are) changing. As one example, consider the changes in English in the placement of an object in relation to the verb. In the thirteenth century, the object followed the verb only half of the time; by 1500 A.D. the object almost always followed the verb (Fries 1940).

There are usually reasons for such changes, often related to the functional considerations we sketched above. Further, some linguists believe we can identify *drift*, the tendency of a language to change in specific directions (Vennemann 1975), and predict some of the changes. It would, of course, be useful for educators to be alert to language change and the direction of that change in order to keep materials for language teaching and other classroom uses up to date.

Fasold (1975) notes that we must be alert to instances of language shift, in which speech communities may be abandoning their native languages. In some communities, the movement is toward *language maintenance*, the continued use of a minority language, or *language revival*, the reintroduction of a language whose use has declined. In developing bilingual education programs for such communities, a certain amount of prescriptivism and active decision making about features of the language will be needed, especially in the preparation of instructional materials, and a good deal of combined sociolinguistic and syntactic study will be called for to determine how best to implement such programs.

PROPOSED RESEARCH IN SYNTAX

From our survey of research in syntax above, and from the general discussion of the relevance of this sort of research to bilingual education, we can now extract some specific proposals for research programs. Some of these proposals call for theoretical research, others for more obviously practical investigations.

A Guide to Language Analysis

In view of the fact that linguists will not be available to study all language varieties, and realizing that any language (such as the Indian languages of Mexico) may someday be part of a bilingual education program, we propose that a guide to language description be developed. Such a guide (which would be based on the sort of research on universals and typology outlined above) would tell an investigator what to look for in a language and how to examine language use in a systematic way. The guide should be addressed to field workers who are not linguists and to teachers who might encounter a student or students with dialect features previously unknown to them.

Development of Course Materials in Linguistics

Two sorts of programs for people involved in bilingual education need to be established:

(a) Short courses in linguistics for curriculum planners, materials designers, evaluators, and test designers, covering the sort of topics we have outlined in this paper. The point of such courses would be to alert these people to the complexity, variety, and regularity of language (ideally, with special reference to the particular languages they deal with).

(b) Short courses in applied linguistics for teachers involved in bilingual programs, making use of the guide to language analysis described above. The point of these courses would be to alert teachers to important differences in languages and varieties, to counsel tolerance of differences when this is appropriate, and to suggest ways in which teachers can approach specific problem areas. (Again, special reference should be made to the particular languages with which the teachers deal.)

Contrastive Analysis and Error Analysis

In order to identify structural similarities and differences, contrastive analyses between English and the various mother tongues of children in bilingual programs (and possibly between other language pairs) are called for. Analyses of interference and other second language learning errors are also helpful, since

predictable influence can often be prevented from altering the first language or from slowing the rate of second language acquisition by bringing special attention to the structures involved. And if the influence is likely to occur only in a brief transitional stage of language learning, it would be useful to know that special attention is not needed.

Variation Studies

For any particular program in bilingual education, the dialects and styles of speech used, both of the native language and of English, must be adequately described and made known to those concerned with the program.

Language Contact Studies

The bilingual classroom is only one of a number of situations in which language contact and interaction take place; other contact situations result in the development of trade languages, pidgins and creoles, "accented" varieties, "mixed languages," "foreigner talk," mutual borrowing, and so on. From study of these situations, we can hope to learn about the types of constructions that are most easily learned in situations of informal contact between speakers. This information can then be utilized in the design of instructional materials.

Language Acquisition Studies

Studies of second language acquisition of children in the 6-12 age group are much needed. The problems such children will encounter will be quite different from those of the well-studied five-and-under age group, who seem to learn second languages in much the same way they learn their first language.

Surveys of Classroom Problems

A very direct and practical attack on problems in the bilingual classrooms would be to survey what teachers see as difficulties involving grammar and to ask what kinds of information and materials they need. Such a survey, coupled with direct analysis of problems and needs, could provide useful information. Observation and experimentation in bilingual classrooms (along the lines of Cohen 1975) would also be valuable.

Theoretical Research

Even "pure" research can have educational implications. Syntactic theories have contributed to education already (though perhaps not to the extent some writers have claimed), and we can expect further contributions as theories are advanced and developed.[22]

FOOTNOTES

[1]The asterisk indicates either an impossible combination, an awkward combination, a sentence that does not communicate a well-formed meaning, or one that does not communicate the meaning intended by the speaker. A question mark is used to indicate items which might be acceptable to some speakers or in specific contexts.

[2]This discussion of syntax leaves out several important complexities, to be dealt with in our discussion of discourse relationships.

[3]Parentheses are used by linguists to indicate optional or deletable elements; any linguistic example with a portion in parentheses should be read as two examples, one with and one without the elements enclosed in parentheses.

[4]For general discussions of the phonology of casual speech, see Zwicky (1972) and Dressler (1975). Dressler particularly stresses the importance of casual speech studies for language learning.

[5]NP stands for *noun phrase*, Aux for *auxiliary*, VP for *verb phrase*, S for *sentence*, V for *verb*, N for *noun*, *be* for the various forms of the copula, Det for *determiner*, Pro for *pronoun*, and Nproper for *proper noun*.

[6]See the section on the relationship of morphology/syntax and semantics (19-21) and Lyons (1968:Ch. 7).

[7]*Surface subject* refers to the subject of the sentence as that sentence is written or uttered. The *logical subject* or *deep structure subject* refers to the sentence subject on an underlying or abstract level. For instance, the surface subject of the sentence The city was surrounded by the enemy is the city, but its logical or deep structure subject is the enemy, whereas in The enemy surrounded the city, the enemy is both the underlying and the surface subject.

[8]The organization of this section and many of our comments owe much to the "Language Typology and Syntactic Field Work" project of the Center for Applied Linguistics.

[9]The material in this section follows, in part, the arguments of Hass (1970) and Fraser (1972) though it is not directly based on either. An earlier version of parts of this section was presented by Zwicky in 1973, at the Washington (D.C.) Linguistic Circle and the Graduate Center at the City University of New York.

[10]The general interchangeability of active and passive sentences (and similar pairs) in discourse was one of the motivations which first led Harris to posit transformations. See Harris (1952) and later works from the Transformations and Discourse Analysis Project at the University of Pennsylvania.

[11]Combinations causing difficulty in perception are treated in the next section.

[12]This section summarizes the material on the Like Form Constraint in Radford (1977). Radford notes the distinction between the sequences of elements covered by this constraint and the common linguistic phenomenon of *reduplication*, in which the repetition of some element conveys a specific meaning in itself.

[13]This example, and its history, is treated at considerable length by Bever and Langendoen (1971).

[14]The term seems to be due to Lakoff (1973).

[15]Similar proposals were made by the universal grammarians of the 17th and 18th centuries and by the artificial language constructors of the 19th and 20th.

[16]Hunt (1973) notes that command of deletion and reduction transformations characterizes writing skill. Sophisticated writers will include more subordinate clauses in sentences. And, of course, the more subordinate clauses added, the greater the length of the sentence. Only through the use of deletion and reduction transformations can a writer "pack" more information into a readable unit. Children's writing skills and development, Hunt maintains, can, in fact, be measured by calculating the degree of subordination and clause reduction in a sentence.

[17]For a bibliography on languages placing clitics in "second position," see Hale (1973:320).

[18]Selkirk (1972) surveys the literature on this cliticization and a number of others in English and French. Kayne (1975) gives a very detailed treatment of the syntax of the French clitics. A summary of dialect differences in the treatment of the English auxiliaries can be found in Wolfram and Christian (1975, 1976).

[19]The introductory discussion in this section is an adaptation of material in Jespersen (1924:Ch. 3).

[20]The English perfect is then misnamed, since its normal use in modern English is not for perfected, or completed, action.

[21]See the proposal in Lyons (1966).

[22]Functionalist theories, for instance the Cognitive Grammar of Lakoff and Thompson (1975b), are promising in this respect.

Semantics

John M. Lawler

INTRODUCTION

Semantics is the area of linguistics which deals with meaning. This simple definition, while true as far as it goes, is in need of some expansion, for in at least one sense it claims that all of linguistics is semantics. The first task of this review will be to discuss *meaning* to arrive at some sense of the term which will allow us to survey the field called semantics. The interrelationships of semantics with syntax and pragmatics can then be discussed, and finally we can begin to consider topics in semantics in terms of their relevance to applications in bilingual education.

Let us first consider a narrow sense of the word *meaning*, one in which only words (or, more technically, *morphemes*[1]) can be said to have meaning. This leads to a view of semantics as *lexicography*, the linguistic discipline involved in making dictionaries. This view has held sway in various circles at various times. In lexicographical terms, we can speak of the meaning of a word, but not the meaning of a sentence as distinct from the sum of the meanings of its constituents. Unfortunately, this view is too narrow, since linguists need to be able to talk about the meanings of sentences (or utterances) independently of the meanings of the words comprising them. And in a sense it is silly to speak of the meaning of a word outside of an utterance, since, in human behavior, words seldom appear outside a context. Consider, for instance, the a sentences in (1) and (2). They contain the same words as their respective b sentences, and the ordering is the same in each case:

(1)a It's not apparent that he will arrive on time.
   b It's apparent that he will not arrive on time.

(2)a It's not likely that he will arrive on time.
   b It's likely that he will not arrive on time.

(3)a He got sick today.
   b He got the package today.
   c He got married today.
   d He got the idea today.
   e He got the storm windows up today.

We would like to be able to say, however, that (1a) does not have the same meaning as (1b), while (2a) and (2b) are much closer to having the same meaning; clearly, an approach which "adds up" the meanings of words will not help explain this difference. (3) raises the question of just how many meanings we must assign to the word got (or, alternatively, just how many words got there are in English) in order to account for the various uses manifested.

But the view that words have meaning only in the context of utterances also is too restrictive, since utterances themselves occur in contexts--in a speech situation which can affect the meaning of these utterances considerably. Consider, for example:

(4) Mary should be home by 12.
(5) This is Frank Smith.
(6) He didn't.
(7) Bill thinks on the kitchen table.

(4) can have at least two meanings, depending on the context: if it is uttered by Mary's mother to Mary and her escort as they leave the house, it has one meaning; if uttered by Mary's husband over the telephone to someone calling Mary, it has a different meaning. (5), which seems straightforward, has a different sense when uttered on the telephone as an identification, as opposed to when it is used to point out a picture in a photo album. Only the context can tell us who he is in (6), and what he didn't do. Finally, the rather bizarre image conjured up by (7) dissolves when the sentence is put into context as an answer to (8).

(8) Where did you leave the checkbook?

One can, of course, go further in defining meaning. Speakers of English do not hesitate to use the word to refer not only to the meaning of a word or sentence in context but to the sense of the context as well:

(9) What's the meaning of this intrusion?
(10) That's not what I meant to say.
(11) Running out of gas on a lonely road means a long walk into town.
(12) The meaning of the Treaty of Brest-Litovsk is hard to assess.

Obviously, these and other uses of the term *meaning* take us far beyond the realm of linguistics, strictly speaking. Still, if semantics is defined as the study of meaning, then the meaning of *meaning* should be significant to it and to those who would understand it. Close paraphrases of (9)-(12) are:

(9') What is the purpose of this intrusion?
(10') That's not what I intended to say.
(11') Running out of gas on a lonely road is associated with a long walk into town.
(12') The consequences of the Treaty of Brest-Litovsk are hard to assess.

We see that the word *meaning* is correlated with concepts of (mental) association, intention, purpose, and cause/effect. These all have to do with thought processes, and thus semantics necessarily comes to be viewed as the study of human thought. The discipline of semantics, then, would be especially useful if it would permit a precise description of people's thoughts so that one person would know exactly what another was was thinking. But we know that every individual is unique, and that each person's thoughts and experiences are intrinsically and necessarily private, so that even the most exhaustive analysis cannot come close to exactness. Nevertheless, we all try to understand and be understood from time to time, despite the odds against success, and one way we do this is to use language as a medium. Sometimes we succeed in this way (or think we do), and it is the semanticist's task to study human thought as it is expressed in language and as it is conditioned by the social conventions of language use.

To study human thought, semanticists typically restrict their theories (and therefore their realm of interest) to the relationship of various concepts to one another, and to the linguistic signs used to represent these concepts. In some cases semanticists restrict their studies to still smaller domains, such as words or sentences. The rigor and mathematical nature of semantic theories are the result of this narrowing of focus. It is not claimed that such formulations represent basic laws of human thought. When confronted with the complexities of actual language use, the semantic boundaries tend to get very fuzzy. The discipline, at its most productive and useful, formulates new questions about meaning, but provides few clear answers without overlapping into the areas of concern of syntax and pragmatics.

The Relationship of Semantics to Syntax and Pragmatics

The three fields--semantics, syntax, and pragmatics--all examine a single phenomenon: human language and its use. Thus, considerable overlapping between the fields is to be expected. In fact, many linguists (including this author) maintain that the three are, in principle, inseparable, and that a unified approach to the study of language

is necessary. Perhaps a metaphor will do the best job of placing semantics in this broader perspective. Syntax, semantics, and pragmatics can be conceived of as lights shining from different directions on a tangled skein of phenomena called "language." If we consider only the light from a single source, some phenomena will be highlighted and others obscured in shadow.

In order to see the whole picture, however, we need all the illumination we can get. The light that is shed, then, by these sources is analogous to the methods and objects of investigation inherent in the disciplines: syntax deals with structures and constituents, semantics with the interactions of meaningful elements, and pragmatics with human interactions and communication. All have empirical bases, and all make use of intuitions--syntax deals in grammaticality judgments, for example, while semantics uses intuitions about synonymy and paraphrase and pragmatics about acceptability and conveyed message in context.

American linguistics is currently moving away from its 20-year preoccupation with syntactic research. This work, known as *generative linguistics*, has produced an unbelievable amount of theory construction and controversy, and, most importantly, sound results and generalizations useful in all areas of linguistics. Semantics and, to a lesser degree, pragmatics have benefited enormously from these developments, and linguists of all persuasions are now trying to integrate the ongoing research of several schools. The lights have never shone brighter, so much so that it is sometimes possible to get lost in the glare. It is the purpose of this review to look at some of the things that have been illuminated from the viewpoint of the semanticist.

Semantics and Bilingual Education

A further purpose of this paper is to suggest applications of semantics to bilingual education. There are certain areas of inquiry in semantics, for example model theory and Montague grammar, which are so abstruse and theoretical that it is virtually impossible to conceive of their being applicable to a practical concern like education of any kind. Hence, I will simply not mention a number of areas of current interest. While today much more effort in semantic research is being addressed to topics of more practical concern, the current state of theory construction does not, in general, provide ideal candidates for practical application. I can, then, only point to topics and findings of semantic research which might, when the theories are more developed, be applicable to bilingual education.

With these reservations in mind, I will suggest some areas of research which, I think, are at the intersection of the interests of semanticists and educators in bilingual programs. These areas are those which will:

- reveal the most, and the most unpredictable, variation from one language and culture to another.
- relate most closely to the culture and unspoken values of the speakers of the language(s).
- deal with the non-overt thoughts of speakers--their intentions, beliefs, and desires.
- determine those characteristics shared by all languages and cultures which can help people from different backgrounds understand each other, if only minimally.

Categories of Semantic Study

Since semantics encompasses a vast network of relationships among meanings of different types, I have somewhat arbitrarily divided the topics I will discuss into five categories, according to the purposes and methods of research. These, in turn, affect the applicability of the results of the research. Naturally, there is considerable overlap, and it is hard to categorize many studies definitively.

The first category is *cultural studies*. These involve attempts to determine the role of language as the vehicle of the culture and of culture as the vehicle of language. Such studies tend to use methods derived from anthropology and sociology. *Lexical studies* attempt to characterize and classify words according to their meanings. Combinatorial methods of some type are often used in such studies.

Structural studies seek to integrate types of meaning with the structures that express them. Syntactic methods are often involved in these studies. *Epistemological studies* attempt to explain the role of knowledge and beliefs in expressing and understanding meanings. Methods developed in the study of philosophy and literature are often employed. Finally, *logical studies* seek to discover and exploit the natural logic of human thought. Mathematical logical methods have been borrowed for such studies. The relationships of semantics to the fields of syntax and pragmatics, particularly in the categories of culture, structural, and epistemic studies (which overlap considerably), should be clear from this categorization.

It should be noted that these categories are not presented in any order of importance to the field of semantics. Logical and lexical studies can, in fact, be considered "core" semantics; cultural topics are a nascent concern of linguists. However, as it is one goal of this paper to deal with applicability to practical matters, I will treat the topics in an order of more obvious relevance.

Many topics can be (and have been) profitably investigated from a number of these viewpoints. To take only one example, *modals* (e.g. can, may, must, possible, enough) constitute the subject matter of one form of logic (*modal logic*), but other studies have been made as well of their lexical, epistemological, structural, and cultural aspects. Our knowledge of modals is the result of all of these types of studies.

One further classificatory scheme cuts across this five-part categorization. Linguists are interested both in facts about individual languages and in facts common to all languages. These latter, which are loosely termed *universals*, have great relevance to linguistic theory at all levels. For example, all languages have consonants and vowels, and all languages have nouns and verbs. However, just which vowels and consonants languages have varies enormously, subject to very subtle and not-at-all apparent universal constraints, and just which word in a language is a noun and which is a verb is not always easy to determine. The notion of universals, then, provides a common basis for comparing and contrasting languages as to the manner in which the universals are manifested. I will mention a number of phenomena which are universal in the abstract, but language-particular in practice, and which give rise to crosslinguistic differences which we could expect to be troublesome in situations like bilingual education, where more than one language comes into play.

Two final notes of caution. First, this survey of topics in semantics represents only the tip of an iceberg. Further, at least in my view, the field is in a somewhat chaotic state at present--a state as frustrating as it is exciting. Second, semantics is by no means the exclusive property of lingusitics. Anthropologists, philosophers, psychologists, psychiatrists, sociologists, literary critics, educators, and many others have all studied aspects of semantics from their various perspectives. This work will not be touched on here except as it has affected linguistic semantics.

CULTURAL STUDIES

This area of investigation deals with those semantic facts that are influenced by and reflect the culture of the speakers of a given language. Naturally, one language may be spoken by people in a number of different cultures--English is a good example--and there will be an enormous range of variation resulting from social, economic, and geographical factors. But this is the subject matter of such other disciplines as sociolinguistics and the ethnography of communication (Fasold 1975 and Scherzer 1975). We will concern ourselves with certain topics more directly in the area of semantics.

Research Overview

Linguistic taboos and euphemisms. The concept of *salience*, which we will treat in detail in the discussion of epistemological topics below, is also useful in speaking about cultural matters in semantics. In the U.S., to take a nonlinguistic example, it is irrelevant which hand a person uses to perform most actions unless some physical asymmetry interferes with a convention, such as shaking hands or using scissors. In Muslim cultures, however, it is extremely important which hand

is used for performing certain actions. It is rude, even insulting, for instance, to give a person anything with the left hand. Such cultural phenomena have linguistic analogs.

A good example is the matter of taboo. English, like all languages, contains a number of words and phrases which have meanings that are banned, or at least avoided, in certain situations; there are taboo words in English dealing with death, elimination of body wastes, sexual activity, and religion, for instance. Americans tend to think of these as *the* taboo areas, but many cultures have no taboos on these areas, but rather on others--personal names, eating, ritual objects, various animals, or natural phenomena. When learning a new language, people do not automatically absorb native speakers' attitudes toward taboos. They may regard language usage in these areas as silly, since it often tends to euphemisms.

The phenomenon of euphemism itself needs explication. R. Lakoff (1973) distinguishes two types of euphemism, each confined either to technical (formal) contexts or to informal contexts. These can perhaps best be illustrated by examples of their use *outside* their appropriate context:

(13) Making number two is generally expedited by the use of large banana leaves. (in an anthropological journal)
(14) Excuse me, I have to defecate. (at a cocktail party)

There is a special class of informal euphemisms suitable for children, and a larger class used in informal conversation with non-intimates (with intimates, the taboo terms are often allowed); the formal euphemisms are suitable for technical discussions or in a formal exchange with non-intimates. In all cases, euphemism is used to distance the speaker from the taboo term, and thus from the taboo concept.

Taboo terms are among the most tenacious in the language (a fact which proves that they must be used or they would not have been learned). Euphemisms, in contrast, have a short life, since, if they are successful, they will be used often. They will gradually acquire closer reference to the taboo area and will become taboo themselves. What we now call a toilet, for instance, was known previously by a number of other names. These became tabooed and necessitated the introduction of the word toilet, which used to mean a washing-up; toilet now appears to be tabooed by some, as indicated by the use by advertising copywriters, at least, of the term bathroom bowl.

Obviously, knowledge of American taboo areas and taboo linguistic items, a firm command of euphemisms, and of the occasions appropriate for their use are necessities for people attempting to assimilate to American culture and to learn accepted language use.

Politeness. The converse of taboo is politeness, a topic which has had relatively little study. R. Lakoff (1973) has developed general principles for politeness in language, applicable to all cultures, which has the effect of making them somewhat contradictory. The contradictions are resolved in different ways in different languages and cultures. She notes, for example, is that while must reports an obligation or order, and is therefore less polite than may, which expresses possibility or permission, (15) in English usage is more polite than (16) when uttered by a hostess to her guest:

(15) You must try some of this cake.
(16) You may try some of this cake.

The reason is that (15) pretends that the cake would not be taken without "orders" to do so, since it is not desirable. (16), on the other hand, assumes that the guest would want some cake; the hostess exploits her position of quasi-authority to give permission, thus elevating both the hostess and the cake and demoting the guest. (15), while it elevates the hostess, demotes the cake (and thereby indirectly the hostess, who is responsible for it), and thus elevates the guest in esteem, relative to the hostess. Such complicated make-believe is typical of politeness in all cultures, but the ways in which it is manifested linguistically vary widely. Japanese, for example, accomplishes exactly what (15) does by means

of overt honorific and de-honorific markers attached to the appropriate nouns, and of different word choices (see also R. Lakoff 1972a).

Language and sociocultural boundaries. Another area in which cultural attitudes are reflected linguistically is in the languages used by and about members of groups subject to discrimination. R. Lakoff (1975) has carried out an extremely interesting study of women's language, and has found, not too surprisingly, that English is a male chauvinist language. She finds that:

•Women are property, linguistically--even when their possessor is dead. One can say (17) but not (18).[2]

(17) Mary is Sam's widow.
(18) *Sam is Mary's widower.

•Lexical pairs of male/female terms are asymmetric. The female term is often derogatory in some way: bachelor/spinster; professional [doctor, lawyer, academic--male]/professional [prostitute--female]; working man (*boy)/working girl (?woman); to father a child [=to impregnate a woman]/to mother a child [=to provide a child with nurturance, often to a suffocating degree].

•Women who express themselves clearly and forcefully are characterized as "mannish," "unfeminine," and "pushy"; women who do not do so are "flighty," "feminine," and "scatterbrained."

One way to establish and maintain in-group membership, behaviors central to discrimination, is to speak in codes that people outside the group cannot understand or cannot imitate. These codes may be real languages, dialects, argots, or just an exaggerated use of slang. This strategy works just as well for small, temporary groups as it does for larger, socially defined ones. In smaller groups, irony can also function as a vehicle for in-group solidarity and out-group exclusion (Myers 1974, 1977, 1978).

Cognitive maps. Another approach to explicating the mutual relationship of language and culture is the notion of a *cognitive map*. Basic to this approach is the assumption that linguistic differences correlate with cognitive differences, so that in understanding the organization of a language, we can gain insight into the way its speakers think. The relationship between language and thought is not, however, seen as deterministic; widely varying world views are often evidenced among speakers of the same mother tongue (Becker, in press, Becker and Oka 1974, and Adams and Conklin 1973). Adams et al. (1975) have studied Southeast Asian languages from this perspective, using classifier systems and other data, and have succeeded in making some very important contributions. Becker and Oka's research on person in Kawi, for example, shows that, in addition to a first-second-third person distinction, Kawi has two sets of pronouns, distinguishing between close and more distant interpersonal relations, rather than between singular and plural, for example, and that there seems to be "a recurring structural contrast between close and distant, involved and detached, now and then, head and blood, mountain and sea --all of which seem basic to Kawi grammar (246-7)." Matisoff (1973, 1975) has studied similar matters in several languages. Lawler (1973a) discusses cultural premises about work and the use of occupational generics in English. Finally, there is an extremely interesting study on American cultural values by Cooper and Ross (1975). Focusing a very thorough study on a relatively unimportant English phenomenon (what the authors call *freezes*, like here and there/*there and here), the authors discuss American culture as it has influenced the language. They also make serious suggestions for the study of cultural semantic universals. This led in turn to the implications discussed in Ross and Oehrle (1977) about the semantics of target structures and in Ross (1975) about the structure of the lexicon. Such topics of what I term *nondiscrete* linguistics may prove to be fascinating and productive areas of research (see also Ross 1974).

Relevance of Cultural Studies to Bilingual Education

Cultural topics in semantics should play an important part in education, particularly in those programs designed to deal expressly with language or to open students'

eyes to other cultures. Educators would benefit, for example, from a knowledge of the differences in cognitive mapping, politeness, taboos, and euphemisms, and linguistic means to differentiate subgroups in the students' mother tongues. Contrastive studies in these areas of cultural semantics would be helpful in pinpointing expressions or topics which students are likely to misunderstand or which might cause offense.

Much less research has been done by linguists in this area than in other areas we will discuss. Anthropologists and sociologists have done considerable work, but the linguistic sophistication of such research is sometimes open to question, as is the nature of the conclusions, which seldom have to do with language as such. Clearly, more research is called for and would provide useful insights for education.

LEXICAL STUDIES

Research Overview

This area of investigation (which, I repeat, overlaps considerably with the others) is primarily concerned with the semantics of words. The lexicon is the place *par excellence* where languages differ from one another; we can then expect to find many accounts of such differences in lexical studies, and also some attempts to relate the meanings of words within language and, by means of semantic principles, to other lexicons. Educational applications should not be difficult to find.

Componential approaches to word meaning. Probably the most important single principle in lexical studies is that meanings of words are not units; they can be "decomposed" in a number of ways. Several theories of semantics have ideas about how to carry out the decomposition and about what the semantic units are which the words are composed of. The theory of *lexical decomposition* (McCawley 1968a and b), for example, posits basic units called *atomic predicates*--atomic because they are assumed to be undecomposable, and predicates because they are combined by the principle of the logical relation of predication. There are, according to this theory, a relatively small number of such predicates (perhaps one thousand or fewer), but their combinations can encompass a vast number of possible lexical items. Other theories employ functionally analogous concepts, like *semantic features*. (We will hereafter use the term feature to refer to any partial specification of meaning, e.g., the English word *man* has the feature "human.") Such features are collected in bundles according to principles of combination to specify the meaning of an item.

Given that there are components to meanings, an immediate problem is to determine what these components are in a given instance, and, less obviously, to choose the correct one from among the possible specifications. To take a crude example, suppose I defined mayonnaise as "that awful stuff some boor put on my chopped liver last week." While this may be a true definition (and may even represent the way I think about mayonnaise), it would not be very useful unless you had been with me on that particular occasion. A more useful definition would refer to the contents of the sauce, the manner in which it is prepared, and possibly the way it is used. That is to say, words are used to communicate with others in a society, and therefore must have reference to concepts which others know--idiosyncratic referents are useful only to the extent that the addressee is familiar with the speaker. Therefore, meanings tend to be expressed, and to be expressible, in terms of other, more basic meanings. In the best of all possible worlds, human languages would have a relatively small number of semantic building blocks, obvious to all, from which each language (or speaker) could construct whatever edifices it chose, limited only by the ways the blocks could fit together. Unfortunately, there are problems with this model in this imperfect but interesting world.

The problem of semantically insulated spaces. To begin with, there is the problem of what I will call *semantically insulated spaces*. There appear to be sets of words, referring to concepts common to all human languages, which are defined largely or even only in terms of one another. Such sets constitute closed systems,

and are not readily susceptible to lexical (dictionary) definition. Examples are the sets of words denoting *deixis* discussed by Fillmore (1971a), or the Atsugewi motion terms discussed by Talmy (1975). Fillmore's work on deixis has far-reaching implications for semantics, since he is interested in determining how much information (contextual or noncontextual) an utterance conveys to a listener, and what information is necessary on the part of the listener to understand it. For example, the terms right and left cannot be satisfactorily defined in independent terms, although it is clear that one is the opposite of the other. The use of deictic expressions of place, person, time, and social usage shows that there is much information, from our culture or from our knowledge of the real world, that enters into lexical meanings; a strictly lexical definition is often not sufficient.

Another case, also discussed by Fillmore (1974a), is the set of words denoting nonvisible feelings. While a cut or a bruise can be pointed to, how do we know what heartburn means if we've never experienced it? Fillmore suggests that the closest we can come is "how you feel after you've had three raw onions and a large Coke"; obviously, this is not a straightforward componential definition. Note, however, that it does have a lot in common with the facetious definition of mayonnaise given earlier. There are many such insulated spaces in the lexicon of any language, and while many of them are susceptible to common-sense definitions, like Fillmore's, which appeal to universal (or near-universal) human experiences, many of them are culturally bound and inaccessible to those who are not members of the culture. Language learners must, then, "learn the culture" as well as the language itself, at least to the extent (if not beyond) where such words begin to make sense.

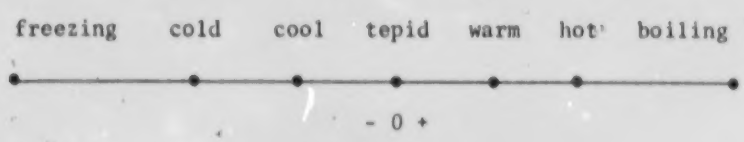
Culture-specificity of feature salience. Even where a word may be lucidly defined, the *salient features* of the definition may seem curious, especially in languages other than one's own. Each language has a number of ways of combining features, most using particularly pertinent features to distinguish large sets of words. For instance, sex is a fact of all human existence, and all human languages have sets of words denoting males and females. Likewise, there are kinship terms in all languages, but the features selected as salient vary widely--Norwegian distinguishes between maternal uncle (morbror) and paternal uncle (farbror), Puget Salish between older and younger siblings. Some kinship systems, notably in Australia, are elaborated to an extent which is hard for Americans to believe (let alone understand); the features defining relationships are salient in those cultures but not in ours. The Puget Salish word /šəg^{w}ɬ/ translates to the English words 'road' and 'door.' This does not mean, however, that /šəg^{w}ɬ/ means 'road or door'; it is a unified concept having to do with movement, particularly of human beings--people pass along a road and through a door. The context specifies which, if necessary, and Puget Salish speakers feel no more need for a special word for 'door' than English speakers do for a special word for 'end of a hallway.' In contrast, English does not distinguish the two verbs 'drop by accident' and 'drop on purpose,' which are carefully kept separate in Puget Salish: if we rely on linguistic evidence, the features of responsibility and volitionality are very salient in this culture, but not in English-speaking cultures.

Synonymy and antonymy. A componential approach to meaning allows one to talk about synonymy and antonymy: there are words that seem to be the same in meaning, and there are, likewise, words that everyone knows are "opposites." Once again, however, things are not as simple as they seem. While it is fairly simple to find the opposite of good or soft, is there an opposite for cigarette, or smoke, or red? Antonymy is also a matter of salience; good and bad differ in the value of one feature only--something that is good has a "plus" value for this feature, and something bad has a "minus." This feature is the salient one for a contrast using good. There is no obvious candidate for such a salient feature in the case of, say, red. (There are contexts in which the salience is supplied, and therefore opposites exist--in checkers, for instance, the opposite of red is obviously black--but note that the choice of the salient feature is not intrinsic to the meaning of red.) A similar but far more elaborated system of antonymy has been described by Hale (1971) in the Walbiri language of Australia. It is possible to find an antonym of *every* word in the language by systematic exploitation of the principles of cultural and semantic salience. Several other Australian languages have also been studied to determine the salient and basic aspects of the semantic features in the lexicon

(see Dixon 1971 and Hale 1974).

The principle of salience in antonymy also helps explain how we understand some cases of irony. Here, the speaker utters a phrase or sentence, but we have some clue (from intonation, facial expression, or context) that he means the opposite of the literal meaning of his utterance. In casting around for a meaning, we find that the closest thing in meaning to a given word or sentence is its opposite, since it differs in only one feature--the salient one in that discussion (see Myers 1977 for discussion).

Semantic scales also raise interesting points with reference to antonymy. Hot is opposed to cold, warm to cool, boiling to freezing, but what is the opposite of tepid or lukewarm? In fact, these words are all part of a scale of temperature, with freezing at one end and boiling at the other; the other terms lie at intermediate points, and their opposites occupy corresponding points on the other side.



Tepid has no opposite because it is the neutral point, on neither the positive nor negative side.

There are many words associated with scales of various sorts, and these scalar relationships impose semantic and syntactic restrictions on sentences. Note the strangeness of (19):

(19) ??She's beautiful, if not pretty.

The word absolute(ly) is used to modify words at the extremes of scales; thus it is odd in (20) but fine in (21):

(20) ?*It's absolutely warm in here.
(21) It's absolutely boiling in here.

Similarly, the word mad in English has two meanings, the first, 'angry,' is not at the end of a scale, but the second, 'insane,' is, so the use of absolutely will disambiguate (22):

(22) He's mad about that. (can mean 'angry')
(23) He's absolutely mad about that. (can't mean 'angry')

In principle, we can refer to any point on a scale and find there are words which let us reach points for which there are not special words: thus, very warm is intermediate between warm and hot. This mobility in meaning is very useful, since it allows us to be both more and less precise at the same time; saying (24)

(24) The room was reasonably warm.

lets us pin down the temperature of the room as exactly as we need to, without having to give a thermometer reading. Studies of such scales and of semantic *fuzziness* have been made by G. Lakoff (1972a) and Horn (1972).

The nature of the items in the lexicon has been ignored in this review. This is its usual treatment in semantic discussions, since the view, at least since de Saussure (1922), has been that the relationship between the meaning of a form and the phonological shape it manifests is arbitrary. We should note that recent work by Ross (1975) challenges this assumption, at least for some classes of words; there appear to be, at this very early stage of research, some unexplainable regularities in the form of words, depending on their meaning. This is particularly true of opposites and of scalar terms. These regularities occur across languages,

not just among Indo-European languages. Ross's hypothesis, if correct, could lead to fundamental changes in the way linguists view language.

Antonymy, then, can be seen to be a very complex concept. Synonymy should be simpler, but it, too, presents problems. It seems a general principle that languages detest synonyms. If a language has a pair of synonyms, for whatever reason, it is very likely that, in time, each word will develop a different meaning, or one will drop out of use. This appears to be due to a principle of economy on the part of the speakers (and hearers)--after all, who needs two words for the same thing? Differentiation of lexical items signals difference of meaning in the overwhelming majority of cases, and a speaker of a language, presented with two putative synonyms, will try hard to find a meaning difference, even if he has to make one up. If this happens often enough, the two terms will not remain synonyms long. Examples abound. For instance, the Norman invasion brought a plethora of French terms into English, including the French words vache, porc, and mouton. These could not exist as synonyms with English cow, swine, and sheep, and so developed the meanings of the meat derived from these animals--beef, pork, and mutton, as they have been anglicized. (This development is not unexplicable, since the Normans probably saw the meat more often than they saw the animals.)

Another way synonymy is avoided is by the adoption of special sets of vocabulary with distinct meanings. There seem to be basic, culturally salient terms that are primes, or prototypes, along with larger and smaller categories that are derived from these primes. Thus, dog is learned early in English, as is cat, although they are very hard to define in lexical terms. People know, without looking at a dictionary or a taxonomy, that a wolf or a fox is a dog and a lion or a jaguar is a cat--and they are surprised to discover that a hyena is more closely related to a cat than a dog. There are other terms like Pomeranian, setter, boxer, and so on which are obviously derivative and superordinate terms, like carnivore, which also appear to be less basic. Research on the organization of nouns into hierarchies or other groupings and the avoidance of synonymy has been pursued by Fillmore (1974a), Berlin and Kay (1969), and Rosch (1973).

Metaphor, irony, and sarcasm. Antonymy and synonymy do not seem to help explain certain other uses of words. When one utters (25), for example,

(25) My love is like a rose.

one is presumably making a meaningful statement about the individual denoted as my love. But what statement? Does she have thorns? Is she green and thin? Does she have aphids? Does she need mulching? Obviously, these are not what is intended. Metaphors such as this single out a salient feature and posit it of both nouns; in this case, clearly--though not stated--the feature is beauty.

We use metaphors constantly and are rarely misunderstood. This fact alone is staggering, since it means that we are able to pick out precisely the salient dimensions of the metaphor and ignore the others. Further, our ability to do so relies very much on our knowledge of the culture, since the features that determine the meanings of words *and* their varying degrees of salience are culturally bound.

We noted above that salience helps explain why a particular kind of metaphor--irony--is understandable. Myers (1976, 1977) and Cutler (1974) have also begun to explicate some of the processes which allow us to understand this most perverse way of communicating. For instance, Myers (1977) notes that (26), (27), and (28) are appropriate responses to someone cutting in front of you on the highway without signalling, but (29) is not.

(26) I hate people who don't signal. (non-ironic)
(27) I love people who don't signal. (ironic)
(28) I love people who signal. (ironic)
(29) I hate people who signal. (inappropriate)

(26) is a literally true response (allowing for hyperbole, which is not at issue here), and is not ironic. (27) and (28) are ironic, but note that if we insert

negation in the main clause and the relative clause of (28), it is again literally true (or at least as true as (26), which is not ironic). (27), by these standards, is false. Finally, (29), which is as true as (27), is inappropriate as an ironic rejoinder in this situation. There appear to be syntactic, as well as semantic and pragmatic, constraints on irony.

Limitations of componential approaches to meaning. Even when we consider all relevant syntactic and contextual variables, and when we have a reasonable breakdown of features to express semantically primitive meanings, there are some words that resist explanation. Fillmore (1971b) discusses criticize and accuse in this context. He notes that both words refer to some event or action which is judged, by the speaker at least, to be unpleasant, and they both refer to responsibility for the event or action. Thus:

(30) Frank accused Bill of telling Mary about it.
(31) Frank criticized Bill for telling Mary about it.

(30) and (31) can both refer to the event of someone's telling Mary about something and Frank's irritable outburst to Bill about it, yet native speakers will distinguish between the two sentences. The differences relate to a basically epistemological notion, *presupposition*, which we will discuss in more detail below. Essentially, (31) presupposes that Bill was responsible for telling Mary about it, and asserts that Frank said that this was not a good thing to do, while (30) presupposes that telling Mary was not good, and asserts that Frank said that Bill was the person responsible. Criticize and accuse thus share almost the same features, but some are presupposed and some asserted, and the mix is different in each. This distinction must be taken into account in the lexicon.

Much of the past activity in the area of lexical semantics has not been devoted to the nature of the lexicon as such, but rather to the problem of specifying how a particular theory (usually some type of generative semantics) could handle the problems posed by specific words; Horn (1969), R. Lakoff (1971b), and Chafe (1970) are examples. With the lessening of interest in generative semantics, some of the theoretical impetus may have gone out of this type of work. There are, however, new traditions appearing: Fillmore's work (1975) on *frames*, together with work by Rosch and Kay on prototypes, seems to augur well for the future of lexical studies, the more so since this type of research is being integrated with psychological and anthropological studies in the same areas.

Relevance of Lexical Studies to Bilingual Education

Applications of lexical studies to education are not hard to come by, although there is a great deal of overlap of particularly applicable topics with epistemological, cultural, or structural areas of semantic research and with pragmatics. Clearly, words carry more meaning, and different kinds of meaning, than the traditional word lists give them credit for. If languages are to be taught properly, if cultural material is to be presented accurately, and if languages are to be adopted for teaching in content areas, then considerable attention will have to be paid to words--which words are used, how they are used, by whom, and to whom. There is a great deal of information available in linguistic semantics on such topics. Further, research in lexical matters concentrates increasingly on pragmatic concerns in word usage: for example, what situational context evokes a particular word or class of words to describe something and, conversely, what situations are evoked by various descriptions of the same thing? This promises to be a fruitful and exciting area of inquiry which has great potential usefulness to education in general and bilingual education in particular.

STRUCTURAL STUDIES

The notion that the syntactic structure of utterances contributes to their meaning (e.g., a question obviously means something different from a declarative sentence) has been available at least since Sapir (1921). But the detailed studies of syntax of the last two decades have especially encouraged several lines of semantic research

which promise to be very fruitful. There are also immense potential interactions among the topics I will discuss here, including relational grammar, cognitive grammar, functionalism, and many of the epistemological topics discussed in the next section (see Postal et al. 1975; Lawler 1975a, 1977; Tomlin forthcoming; and Dryer 1975).

Research Overview

Case grammar and generative semantics. The first two attempts to employ structural methods to handle semantics were Fillmore's (1968) *case grammar* and the school of *abstract syntax* (later called *generative semantics* in a revised and expanded version). Prior to Fillmore's work, the semantic complexities associated with the grammatical relations *subject*, *object*, and so on were either assumed or ignored. Case grammar, an attempt to deal with these complexities, proposed that each proposition or sentence consists of a predicate (verb) with a number of associated nouns. The verb determined the role, or *case*, taken on by the nouns, that is, the predicate determined the case of the arguments. Additional principles determined other grammatical relations. Thus, case grammar provided a means to specify the fact that a sentence can have a subject which is an agent and an object which is a patient; for example:

(32) Bill kicked Frank.

Case grammar in its original form has been largely abandoned because it proved unable to handle complex syntax and because of the proliferation of ad hoc categories necessary to handle increasingly subtle judgments about roles of nouns. Nevertheless, we have learned that much to do with meaning can be expressed in terms of the structural relationships between predicates and nouns.

Generative semantics also attempted to deal with a number of semantic notions in terms of predicational structures. I have mentioned lexical decomposition, which has been extensively used in abstract analyses of logical structures for words and sentences. This variety of structural semantics also treated grammatical relations in terms of predication. Generative semantics recognized the possibility that predicates could have one or more arguments. There is no logical a priori restriction on how many arguments a predicate can have, but in practice, generative semantics was limited to considerations of three classes of predicates--the so-called 1-place, 2-place, and 3-place types. Examples are (33)-(35):

(33) Bill laughed. = LAUGH (Bill) (1-place)
(34) Bill hit Frank. = HIT (Bill, Frank) (2-place)
(35) Bill gave Frank the book. = GIVE (Bill, Frank, book) (3-place)

(33) is readily recognizable as an example of an *intransitive* predicate, (34) as an example of a *transitive* with both a direct and an indirect object (book and Frank, respectively). There are then implicit claims in generative semantics that: *(a)* logical predication is the basis of all grammatical relations; *(b)* there are only three basic predicational relations (exemplified in (33)-(35) above); *(c)* predicates can be profitably classified semantically according to the grammatical relations they require. In this theory, these logical-semantic notions feed into the syntax. A great deal of research has been done in this vein, and a number of interesting results reported (see the discussion of lexical decomposition above). Several unresolved problems have also come to light, however, resulting in a gradual abandonment of much of generative semantics.

Other structural approaches to semantics. At present there are several emerging traditions in structural studies that bear watching. While they are more or less distinct, in the sense that they are called by different names and are being developed by different groups of people, these lines of study have much in common, and each is influenced by developments in the others. Those singled out for discussion here are functional grammar, cognitive grammar, and relational grammar.

Each of these is primarily a syntactic system, but each has had to come to grips with a variety of semantic problems, and interesting and useful semantic insights have resulted. (A fourth tradition, nondiscrete grammar, is also important in the current potpourri of developing theories, but its contributions have largely been to syntax; some of the significant semantic advances made in this paradigm are noted in the section on cultural topics.)

Functionalist approaches to meaning. *Functionalism* is actually the rebirth of a tradition with a respectably long pedigree; as early as Sapir (1921) and Jesperson (1954), the function of syntax was a target for research. More recently, *natural phonology* (see Bruck et al. 1974) has attempted to put phonological theory on a functional footing. Linguists of the generative semantics school, led by Morgan (1973a) and others, have also delved into the topic. There are, then, a number of different views of what functionalism is; unlike cognitive grammar and relational grammar, there is no theory of functional grammar, nor is one likely to emerge soon--there are too many people doing research on too many topics for a consensus to surface immediately. Common to all functionalist studies, however, is the assumption that at least some aspects of linguistic structure are related to the uses to which language is put. Some researchers maintain that this interrelationship results from the existence of "particular mental mechanisms [which] guide and form certain aspects of linguistics structure," whereas others argue that general properties of both the human mind and the uses of speech are needed to explain linguistic patterns (Bever 1975). The boom in functionalism (see Kuno 1972 and Grossman et al. 1975) has had the beneficial effect of letting common sense into linguistics and dispelling some large clouds of formalism.

As an example of the power of functionalism, we cite Morgan's (1973a) account of *restrictive relatives*. These are the ordinary relative clauses as in (36)-(37):

(36) The woman who kicked him escaped.
(37) The man who she kicked is irritated.

Such clauses pose semantic problems because they are presupposed true, rather than being contingent on an assertion for their truth value. Thus, (36) presupposes that there is some woman who kicked a male person (him), and (37) presupposes that there is a man who a female person (she) kicked. We can explain how this presupposition is manifested by pointing out, as Morgan does, that if the function of a relative clause is "to afford the hearer enough information to pick out some individual, then it is obviously more efficient to give a true description than a false one. The fact that the speaker uses the relative clause for this purpose is prima facie evidence that he believes it is true (424)," i.e. that it is presupposed.

Meaning in cognitive grammar. Such appeals to communicative function have led also to more dramatic changes in theories, in the shape of *cognitive grammar*, as developed by G. Lakoff and Thompson (1975a and b). As a listener-based system, this represents a radical departure from classical generative grammars, which have all been speaker-based, if only covertly. Cognitive grammar seeks to account for the listener's ability to process and understand sentences presented to him in "real time." There is abundant evidence that the first parts of sentences are processed as they are heard, before the rest of the sentence is completed by the speaker. The listener, in fact, makes guesses about what is going to come next and about the role the part of the sentence already processed will play; he discovers later whether these guesses were right or wrong. The well-known *garden path phenomenon*, which is operative in sentences like (38),

(38) The boat floated down the river sank.

can help illustrate this process. A listener who hears (38) will assume that floated is a main verb in the past tense, since the active (noncausative) verb

float can have boat as a subject and has a regular past tense. This assumption will be reinforced by the prepositional phrase, since it is a typical complement for the noncausative float. Then the listener will come to sank, for which there is no place in the parsing he has determined; he will be forced to go back and reanalyze floated as the past participle of the causative float, which can take boat as object, not subject. Floated is therefore the result of a passive transformation--but the passive marker is not there. It must have been part of a relative clause which has been reduced, producing the modifying participle. The hearer's reanalysis, then, entails not only a change of structure, but also an epistemological change from the assertion that the boat (without any overt cause) floated down the river, to a presupposition that someone caused the boat to be floated down the river (hence the relative clause) and an assertion that the boat sank. How much trouble a small change like adding a verb at the end of a sentence can cause, and how much mental labor (performed at breathtaking speed) it can require to correct!

The cognitive grammar approach is similar to (but leads to different conclusions from) functionalist research on speech processing conducted by Bever et al. (1976) and others. It is also amenable to functional explanations, since it deals extensively with the process of communication. Cognitive grammars have available to them all the contextual information (syntactic, semantic, and pragmatic) the listener would use to decode the sentence at each step; thus, cognitive grammar is one formal way to encode functional explanations.

One interesting example of how such generalizations can be explained functionally is the phenomenon of *conspiracies* (see Schmerling 1973, Thrasher 1974, Green 1970, and Lawler 1974). A conspiracy is a tendency in a particular language for constructions with little semantic relationship to resemble one another syntactically. The classic case is the Green conspiracy (Green 1970):

(39) I found him alive (dead).
(40) I consider him alive (dead).
(41) Jesse shot him dead.
(42) They burned (buried, ate) her alive.
(43) The doctor declared him dead.
(44) I saw her alive last week.

Obviously, the meanings of (39)-(44) are quite different, and different syntactic processes must be invoked for each, yet they all seem to have a common structure of Subject-Verb-Object-Adjective, as if the syntax were conspiring to group such sentences together. In analyzing such a set of sentences, a processing model like cognitive grammar [which, unlike classical generative theories (cf. Lawler 1975a), has direct access to semantic and pragmatic generalizations] allows one to take cognizance of such things as the speech situation and context, the structure of the discourse, the probable reasons for the sentence being uttered, the identity and characteristics of the speaker, and so on. Cognitive grammar deals with much more than "grammar," and has tremendous potential as an integrated theory of speech and language.

One of the more vexing problems in recent syntax and semantics has been the semantic correlates of syntactic processes. Borkin (1973), for example, notes that (45)-(47) are not as synonymous as they ought to be.

(45) Bill found that the chair was comfortable.
(46) Bill found the chair to be comfortable.
(47) Bill found the chair comfortable.

(47) represents a state of affairs dealing with Bill's personal experience, (46) reports Bill's experience less personally, and it is not even necessary for Bill to have seen the chair (much less sat in it) for (45) to be true. A perceptually based cognitive strategy recently proposed by Ross and Oehrle (1975) can account for this phenomenon (and many others, including some phonological ones--see p. 35 above).

Semantic aspects of relational grammar. Another emerging theory is *relational grammar*, currently existing in at least two versions, one attributable to Perlmutter

and Postal (1974) and Johnson (1974),[3] and the other to Keenan and Comrie (1977). The semantic aspects of these essentially syntactic theories include fundamental notions such as predication, grammatical relations (subject, object, indirect object), role/case structures, and so on. The primary semantic value of these theories is that they have been forced to specify the properties of the various grammatical relations and of the different predicates to which they are related. These specifications are much more detailed and useful than any prior ones and call upon many of the useful insights of case grammar.

Relevance of Structural Studies to Bilingual Education

The applicability of structural approaches to semantics varies considerably with the particular topic. Cognitive grammar has obvious implications--it is clearly necessary to discover the mechanisms by which people process and understand sentences--but much work remains to be done here. Relational grammar may also prove useful, insofar as it contributes to an understanding of structural topics and as it defines a class of universal characteristics of languages, but it is too early to project specific applications. The study of conspiracies is useful because it forces attention on the semantic complexity of items which seem simple: Thrasher's (1974) work on fragments came about because of the difficulty he found in teaching about such utterances as (48)-(50) in English classes:

(48) Use your phone, ma'am?
(49) Ever in Ann Arbor, give me a ring.
(50) Been a snake, it would've bit you.

In order to produce and comprehend idiomatic English, the language learner will need to understand the principles governing what can and cannot be omitted in such utterances. And, of course, any approach to linguistics that proposes such a reasonable paradigm as functionalism does is sure to have practical applications. As noted above, however, contributions from this approach are unpredictable at this rather unsettled stage.

EPISTEMOLOGICAL STUDIES

It is definitely unorthodox to include in one discussion all of the things I propose to present here as epistemological topics. Nevertheless, a large amount of recent linguistic research has dealt with these topics, and I believe they can profitably be viewed from a single perspective. Much of this research overlaps with pragmatics, just as much of what we discussed in the previous section overlapped with syntax. This is all to the good, since it reveals the essential relatedness of the levels of language and of the areas of linguistic study.

The major feature distinguishing epistemological studies from others is their emphasis on the linguistic expression of the speaker's beliefs. Speakers have beliefs about the world, including whatever topic is under discussion. They also have beliefs about their addressees, their relationships with them, and what the addressees themselves believe. Since one major purpose of communication is to exchange information, more specifically information which one or another participant does not already have, it follows that some provision must be made to avoid repetition of old information when it is not necessary to set the context, and to label it as old information when it is necessary. Consequently, languages have a number of linguistic devices which allow certain information to be either conveyed subliminally or conveyed overtly but "backgrounded" as not being the topic under discussion.

Research Overview

Presupposition. A speaker is said to presuppose a proposition if he believes it to be true, and further, believes that his addressee believes it to be true. There are millions of propositions which fit this description: consider "2 + 2 = 4," for

example. Only a few of these propositions will be relevant to a given speech situation, however, and these will be the ones needed to understand the meaning of a sentence in that situation. To give an example, if someone utters (51),

(51) Bill realizes he was in the wrong.

the speaker believes that Bill was, in fact, in the wrong, and expects his listener to believe so as well. If he did not have this belief, he might report the situation with (52):

(52) Bill believes he was in the wrong.

A speaker can also report someone else's lack of belief in something the speaker believes; in this case, one of the differences between presupposed and non-presupposed propositions comes to light. Consider:

(53) Bill doesn't realize he was in the wrong.
(54) Bill doesn't believe he was in the wrong.

The speaker of (53) still presupposes that Bill was in the wrong; the negation here refers only to Bill's lack of apprehension of the proposition that he was wrong. In (54), the speaker takes no obvious position on Bill's being wrong, and Bill not only has no belief that he was in the wrong, he has a definite belief that he wasn't. Predicates like realize, which show presupposition of their complement clauses, are called *factives*. There are a number in every language, although it is not always easy to find a factive in one language with just the same meaning as a factive in another. They exist because it is necessary to refer to known facts in order to comment on their existence, apprehension, and effects, while still making it clear that the facts are known. On the other hand, it is often necessary to refer to propositions which are *not* known to be true, and parallel nonfactives exist for this purpose. There has been a great deal of research on factives; Kiparsky and Kiparsky (1971), Karttunen (1970, 1971, 1973), G. Lakoff (1972a), Morgan (1973b), and others have commented on them at length. The literature on presupposition in general can be represented by Horn (1969), Schmerling (1971), Lawler (1971, 1973b), Fillmore (1971b), Keenan (1971), and many more.

There are other types of presuppositions, of course. Consider (55) and (56):

(55) Nixon isn't President any more.
(56) Nixon used to be President.

Both of these sentences are true, but they have different presuppositions and they assert different things. If someone asserts (55), and I tell him he is wrong, I mean that Nixon is still President; if I tell someone that (56) is wrong, I mean that Nixon never was President. (55) presupposes that Nixon was President at some past time and asserts that he isn't now, while (56) presupposes that he isn't President and asserts that he was at some past time.

Only assertions can be overtly negated; presuppositions remain presupposed. This fact is responsible for the difficulty one has in trying to answer (57):

(57) Have you stopped beating your wife?

(57) presupposes that you beat your wife at some past time, and neither a yes nor a no answer can alter that presupposition.

Presuppositions account for much of what is called *connotation*, that is, the nonliteral meaning of words and sentences. Much of connotation has to do with presuppositions of goodness and badness; we are all familiar with the fact that firm and stubborn have the same denotation but different connotations. The decision to use one adjective or the other can be accounted for by presuppositions of goodness and badness, usually relative to the speaker's values.

Recent research by Gordon (1974) has demonstrated that presupposition is, in fact, a phenomenon which deals with beliefs. In a psychological study, he found that many native speakers of English accepted or spontaneously uttered sentences like (58)

(58) He knows my name is Benjy, but he's wrong.

where the use of the factive verb know should disallow the contradiction inherent in the second clause. Obviously, know is used here in the sense 'believe strongly,' and its use reflects the fact that the subject of know would undoubtedly use know to describe his own belief. This opens the question of whether the strength of the belief conditions the use of a factive, and of the nature of the relationship between the strength of the speaker's belief and that of the person whose belief is being reported. Needless to say, much remains to be discovered in this area.

The semantics of speech acts. While presuppositions convey old information in some sense, there are also numerous ways to convey new information. A branch of linguistics known as *speech acts* deals with the fact that an act of communication can be categorized as one of stating, asking, requesting, ordering, and so on, and that there are semantic and syntactic consequences of this categorization. This type of research is normally placed in pragmatics, but it deals critically with meaning (see Austin 1962, Searle 1969, Grice 1967, Ross 1970, Gordon and Lakoff 1971, Sadock 1974b, Davison 1973, Cole 1975, Green 1973, and R. Lakoff 1969). A direct speech act is labelled unambiguously by the use of a verb such as order, ask, request, but the successful use of such acts are conditioned by requirements called *felicity* or *sincerity conditions*. For example, in order to successfully make a request, the speaker must believe the addressee is able to carry out the act requested and that he would not do so in the absence of a request.

One of the more interesting offshoots of this research is the discovery that there exist codes for indirect speech acts. In "standard" English, (59) conveys a request to pass the salt, not a question about the addressee's abilities.

(59) Can you pass the salt?

An answer of "yes" with no action following is apt to be treated as a joke, since the asker is not interested in a literal response but in getting the salt. Yet there are many languages (and some dialects of English) where such indirect requests would be considered by a listener as a strange question.

Classroom situations can produce misunderstandings as a result of indirect requests based on sincerity conditions. For instance, one of the sincerity conditions on questions is that the asker not already know the answer--obviously, if he knows it already, he is not playing the game fairly. Yet this condition is flung down and danced upon daily in American classrooms--teachers *always* ask questions they know the answers to. How must such a situation appear to a student from a culture without a tradition of such a language game? Probably as if the teacher is insincere, or crazy, or stupid, or any combination of the above. Such evaluations on the part of the student do not make for viable educational experiences.

Varying strength of speaker belief. There are also many ways to temper the strength of speaker beliefs. We have mentioned some of these above in our discussion of semantic scales. Another frequent strategy is to take an epistemological viewpoint, quite literally, and to refer to the type of evidence which has led to a conclusion. This can be done directly by mentioning the evidence,

(60) I saw his car in front of his house, so (I guess) he's home.

or by referring to the type of evidence,

(61) It looks like he's home.

(62) He must be home.

The epistemic modals have meanings associated with certainty, probability, and possibility, all according to the judgments of the speaker. For example:

(63) He'll be home now.
(64) He should be home now.
(65) He might be home now.
(66) He could be home now.

Even (62) and (63), which indicate strong probability and certainty, respectively, are not as strong as the simple statement (67).

(67) He's home now.

The reason for this is that as soon as the speaker refers in any way to his own opinion (instead of simply stating it), a certain amount of uncertainty is injected. Anything said by a human being is his opinion, after all, so there is no need to note that fact, unless we want the listener to take special notice that it is *only* an opinion. R. Lakoff (1972a and b) deals with this topic, and others, in some detail. Many languages codify much the same set of properties by means of what is called *mood*, for example, *subjunctive, conditional, optative*, and so on, and the syntactic and semantic details are quite complex (as they are in English). There is still much to discover about the means by which the strength of speakers' beliefs in their statements is expressed.

Reference. Speaker beliefs and the speaker's understanding of listener beliefs are crucial also in the matter of reference. It would seem, for example, that identifying the entity denoted by a noun should be easy, but consider the underlined noun phrases in (68)-(70):

(68) I was looking for a policeman, but I couldn't find one.
(69) I was looking for a policeman, but I couldn't find him.
(70) I was looking for the policeman, but I couldn't find him.

The noun phrases in (68) and (69) are *indefinite* (they use the article a), while that in (70) is *definite* (it uses the article the). In (68), the speaker does not have a unique policeman in mind, as shown by the pronoun one in the second clause. In (69), the speaker does have some individual in mind; this is also true of (70). What, then, is the difference? The indefinite in (68) is called *nonspecific*, while that in (69) is called *specific*. A speaker will use a nonspecific indefinite when he has no individual in mind; rather, he is speaking of any individual who meets a given definition. He will use a specific indefinite when he does have an individual in mind, but does not expect the listener to. And he will use a definite when he has an individual in mind, and expects that the listener has the same individual in mind. Thus, definite phrases are often not used in a discourse until after an indefinite has been employed to introduce the individual. For example, consider the following discourse:

(71)a You know how it is--when you want a policeman, you never can find one. (nonspecific indefinite)
b Well, the other night I had to look for half an hour before I came on a policeman patrolling his beat. (specific indefinite)
c The policeman was a little irritated when I asked him to come with me. (definite)

In succeeding sentences, the policeman will probably be referred to as he, until and unless some other male is introduced--then occasional references will have to be made to the policeman to keep things straight.

A meaning which has certain things in common with the nonspecific indefinite is possible also with certain definite noun phrases. Consider (72):

(72) O'Ryan's murderer is insane.

On one reading (the *referential* reading), the speaker has an individual in mind and refers to that (known) individual as O'Ryan's murderer. On the other reading (the *attributive* reading), the speaker is making a statement about whoever the murderer of O'Ryan might be; he has no specific individual in mind. The difference between the two readings has to do with whether the speaker believes a referential description of someone as O'Ryan's murderer will call to the listener's mind the same individual as it does to his own.

One last type of peculiar reference also deals with the source and communicative value of definite descriptions. In (73), there is also an ambiguity.

(73) Oedipus wanted to marry his mother.

On one reading (the *transparent* reading), Oedipus wanted to marry an individual who happened to be his mother. Another possible reading (the *opaque* reading) is that Oedipus wanted to commit incest. The phenomenon of opacity, then, also has to do with who is doing the describing. In (73) the description of Jocasta as Oedipus's mother is given by the speaker, not by Oedipus; we know this because we know the content of Oedipus's play. However, since want is a predicate that deals with intentions, and since intentions have to do with the subject's beliefs, there can be a reading of (73) in which the description is part of Oedipus's beliefs. Opacity is thus a function of a difference between the speaker and some other person whose beliefs are in question. A proof of this is the fact that there is no opacity in the first person--anyone foolish enough to utter (74) is proposing to commit incest, since the description is clearly his responsibility.

(74) I want to marry my mother.

Specificity, opacity, definiteness, and attributiveness are only a few of the topics that have been addressed by philosophers and linguists under the general heading of *reference*. The topics treated in the literature center around speaker's beliefs and speaker's beliefs about others' beliefs (see Russell 1905; Kripke 1972; Donnellan 1972; Quine 1953, 1960; Postal 1970a, 1971; Petersen 1974; Cole 1975; Lawler 1972a, 1973b; Morgan 1975; Dryer 1976; and Nunberg and Pan (1975).

Beliefs and knowledge within discourse. In connected discourse, beliefs about and knowledge of the topic under discussion are subject to rapid change (as demonstrated trivially in (71)). We constantly learn new information, which becomes "old" by the time the next sentence is uttered; it forms a kind of ground for the information conveyed in succeeding sentences. The ideal of communication is to convey only and always new information, but that is not possible, since we must have a contextual matrix into which the new information fits. We have mentioned this ideal previously in regard to presupposition, which is largely a sentential phenomenon, but it is also relevant when we deal with larger chunks of language. Every teacher of composition and rhetoric knows how hard it is to write well, and to teach people to write at all, let alone well. Many problems in writing have to do with clear description, but many also have to do with this transition from old to new information, and the use of devices to show the relationship and relevance of one piece to the other. Languages have a number of these devices, and linguistics has investigated many in an attempt to explicate discourse phenomena. There is a tendency in English, for instance, for subjects of simple sentences to be old information, while predicates and often other parts of the sentence are new. This is not true of all languages, but all languages do have syntactic, phonological, and pragmatic devices to distinguish old from new, and rhetorical traditions that exploit these devices. Consider (75)-(78):

(75) Frank killed Bill.
(76) Bill was killed by Frank.
(77) Frank killed Bill. (heavy stress on Frank)
(78) It was Frank that killed Bill.

(75) is the straightforward active sentence, suitable to a discussion of Frank, or Frank's actions, or Frank's misdeeds. In other words, Frank is old information; his killing Bill is new. (76)-(78) are transforms of this sentence, suitable for other contexts and discourses, where Bill's having been killed is old and the identity of his killer is new. Studies on topics such as these have obvious importance for a number of educational endeavors, especially since the variety of devices used in languages is very wide, and few languages have anything like the same kinds of devices. Research on this topic has been pursued by Daneš (1970), Bayless and Johnson (forthcoming), Tomlin (forthcoming), Halliday (1967), Halliday and Hasan (1976), and Fillmore (1974b).

Relevance of Epistemological Studies to Bilingual Education

A number of applications of epistemological topics which we have suggested in this section can be reviewed here. Presuppositions alone constitute a class of phenomena which can be used to advantage by teachers and writers, or can be ignored with serious consequences. Speech act theory has direct implications for teaching methodology, and the phenomenon of old/new information tradeoff (also known as *topic, focus, theme,* and several other terms) is immediately relevant to teaching writing. Further, attention paid to these areas and to expectable differences in the belief structures of students and teachers (and planners) can avoid a host of potential problems.

LOGICAL STUDIES

To a large extent, linguistic work utilizing modern logic has striven to provide a means to express the propositions that constitute what we might call the literal meaning of language utterances. These propositions are seen, in some theories, as constituting the base of the sentence and as being processed in some fashion by the syntactic rules. The details of these and other theories are irrelevant here, since little of the formal research characteristic of this area can conceivably have applications in the field of bilingual education (or any practical field for that matter). There are, however, some notions arising from logic that, while universal in some sense, are manifested in different languages in unpredictable ways, and are sufficiently important to have motivated a great deal of productive research. Some of this research may be applicable to educational problems, at least insofar as it provides insights to language and to contrasts between languages. The notions which will be presented briefly here are the three types of *logical operators* which are important to natural language (*modals, negation,* and *quantifiers)* and the concept of *predication.*

Research Overview

Modals. English has a class of auxiliary verbs with unusual properties. These *modal auxiliaries* (for example, can, must, may, should, will) are treated in logic as variants of the two basic operators, POSSIBILITY and NECESSITY, and indeed, the syntactic and semantic behavior of the modals allow us to group them into these two large classes. For example, Horn (1972) has shown that there are lexical items and constructions which can only be used around modals which are variants of the operator POSSIBLE. Consider the underlined words in (79)-(81):

(79) I can afford it.
(80) Anybody can do that.
(81) She can't tell time yet.

As can be seen by deleting can, these items depend somehow on the modal for their meaning. And not just any modal will do--must, for example, produces ungrammaticality in these sentences.

Such items as afford, anybody, tell time contain, somehow, the sense of possibility (as opposed to necessity) and hence are termed *POSSIBLE-polarity items.*

These can be used to "sniff out" logical modals which are not manifested as syntactic auxiliary verbs. It turns out that the sense of logical modals is present in many sentences that do not contain an auxiliary verb. For example:

(82) He's rich enough to afford a Rolls.
(83) She's too young to tell time.
(84) Anybody knows that Columbus discovered America.

If we treat constructions with enough and too, and certain uses of know, as if they contained modals in some way, we get a better idea of what they mean: a reasonably good paraphrase of enough in (83), for example, would be 'to a degree which makes it possible.'

Thus, we see that modals are quite frequent in language. Further, they have a number of meanings. In general, each modal has at least one *root* meaning, usually dealing with obligation or permission, as in:

(85) All applicants must complete the form.
(86) You may enter now.

and an *epistemic* meaning, having to do with judgments of possibility, probability, or necessity:

(87) Harry must be home now.
(88) This may be the place

Logic provides a means to distinguish this type of meaning difference.

A logical approach also allows us to explain the divergent meanings of the following sentences:

(89) Harry may not be here.
(90) Harry can't be here.

Epistemic may and can [as in (89)-(90)] both mean 'possible,' but the negation interacts differently with each word. (89) means that it is possible that Harry is not here; (90) means that it is not possible that Harry is here. The logical form of these propositions illustrates this difference precisely:

(91) POSSIBLE (NOT (HERE (Harry))) = Harry may not be here.
(92) NOT (POSSIBLE (HERE (Harry))) = Harry can't be here.

Negation. Negation, a topic dealt with in logic, is also a relevant semantic phenomenon (Horn 1969, 1970, 1971, 1972, 1975; Baker 1970; Lawler 1974; and others). Its implications are considerable for other areas of semantics, and we have discussed it elsewhere. Here we will briefly treat some of the logical properties of negation.

The basic logical function of negation is to change the truth value of a proposition, that is, if a proposition P is true, then its negation NOT (P) is false, and vice versa. Negation, like modals, casts a polarity web: there are numerous words, phrases, and constructions which are peculiar to sentences containing negatives. For instance:

(93) Frank didn't budge.
(94) He didn't ever come.
(95) He hasn't been here in weeks.
(96) They haven't got a red cent.
(97) You need not go alone.
(98) He didn't arrive until noon.

As can be seen by removing the negation, these sentences are anomalous in the affirmative. Like POSSIBLE-polarity items, these NEGATIVE-polarity items allow us to detect negatives in unsuspected places.

(99) Only Bill ever hands in his work on time.
(100) If you ever do that again, I'll report you.
(101) Did you ever meet Ed Jones?
(102) I'm surprised he ever showed up.
(103) Frank denied ever seeing me there.
(104) He's too dumb to ever suspect.

In (99), the negative polarity ever is conditioned by the presence of only, in (100) by if; in (101) the fact that the sentence is a yes/no question is sufficient to trigger the presence of ever. (102) contains surprised, which contains a weak presupposed negative. (103) has deny, and (104) has too, both of which are also semantically negative. Thus, a reasonable paraphrase of too in (104) is 'to a degree which makes it not possible.' Note that this definition is parallel to that given of enough above and that the sentence contains both a modal and a negative.

Negation interacts with modals in interesting ways. As we saw in (91)-(92), the logical placement of the negative vis-a-vis the modal is critical to the meaning. In (91), the negation is said to be *inside the scope* of the modal POSSIBLE, while in (92), the modal is inside the scope of the negation. The other logical modal, NECESSARY, interacts with negatives in a precisely complementary way:

(105) NOT (NECESSARY (P)) = POSSIBLE (NOT (P))
(106) NOT (POSSIBLE (P)) = NECESSARY (NOT (P))

That is, if something is not necessarily true, it is possibly not true (105), and if it is not possibly true, it is necessarily not true (106).

These logical relations surface in English in interesting places; consider:

(107) You must not go.
(108) You don't have to go.
(109) You may not go.
(110) You may stay.

Note that (107) does not mean the same as (108), although must and have to are virtually synonymous (the affirmatives of (107) and (108) are synonymous); instead, by using the formulas (105)-(106) we see that (107) means 'It is necessary that you not go,' with not inside the scope of necessary; we can predict that (107) will mean essentially the same as (109), which means 'It is not possible that you go.' (108) means 'It is not necessary that you go,' with not outside the scope of the quantifier; it resembles (110), which means 'It is possible that you not go.'

Quantifiers. Another class of logical entities is *quantifiers.* There are two types, *universal* and *existential*, manifested in English by the words all, every, each (universal), and some, a (existential). Quantifiers are also said to have scope; for example, the negation in (111) is inside the scope of the quantifier some and the negation in (112) is outside the scope of the quantifier every.

(111) Somebody didn't leave.
(112) Not everybody left.

Note further that (111) and (112) are synonymous; this is the result of a rule of logic dealing with quantifiers and negatives:

(113) FOR EVERY x (NOT (Px)) = NOT (FOR SOME x (Px))
(114) FOR SOME x (NOT (Px)) = NOT (FOR EVERY x (Px))

That is, if it is true of every 'x' that 'x' does not have the property P, then it is not true that there is some 'x' which does have the property P (113), and if it is true that there is some 'x' that does not have the property P, then it is not true that every 'x' has the property P (114). This rule is precisely parallel to that which applies to modals and negatives; in fact, there are logical theories that relate the basic operator NECESSARY to the universal quantifier, and the basic operator POSSIBLE to the existential.

Scope relationships can cause problems; (115) is ambiguous

(115) Everybody didn't leave.

because it is not clear whether the negative or the quantifier has outside scope. Hence, the sentence could be interpreted as either (111) or (112). Similarly, existential and universal quantifiers together can produce ambiguities:

(116) Somebody rings my doorbell every 5 minutes; I wish {he / they} would stop.

One reading of (116) has the existential quantifier outside the universal: 'There is some person such that every 5 minutes that person rings my doorbell'; this corresponds to the reading "I wish he would stop." The other reading ("I wish they would stop") has the universal outside the existential: 'In every interval of 5 minutes there is some person such that that person rings my doorbell.'

There has been extensive work on quantifiers in semantics; G. Lakoff (1970, 1971a), Partee (1970), Carden (1970, 1973), Heringer (1970), Jackendoff (1972), and others have contributed. Quantifiers, modals, and negatives are, as mentioned above, examples of what are called operators in logic; the properties and interactions of such operators in semantics are treated by McCawley (1972, 1975), Horn (1972), and numerous philosophers and logicians, among whom are Hintikka (1972) and Lewis (1972).

Predication. Another logical concept implicit in the preceding discussion, and of great use in semantics, is that of *predication*. One speaks of a proposition predicating something, that is, asserting something to be a quality, attribute, or property of the subject. This is represented logically by the distinction between a *predicate* and its *arguments*. Thus, the proposition Bill is dead predicates deadness of Bill; this would be represented logically as a predicate (DEAD) with one argument (Bill) thus: DEAD (Bill). Propositions themselves can be arguments of other predicates; thus, the proposition Bill died can be viewed as predicating prior occurrence on the proposition Bill is dead, reflected logically by a combination of the inchoative predicate COME ABOUT and DEAD, thus: COME ABOUT (DEAD (Bill)). A predicate can have more than one argument; Bill hit John would be represented as HIT (Bill, John). One can stack predicates almost ad infinitum: a sentence such as Bill wants to begin to learn to speak Spanish (which is lengthy, but not overly so) would be represented as WANT (Bill, BEGIN (Bill, LEARN (Bill, SPEAK (Bill, Spanish)))). There are also sentences involving complex propositions where not every predicate appears overtly in the sentence. For example, Frank killed Bill can be represented as CAUSE (Frank, COME ABOUT (DEAD (Bill)))--that is, kill means 'cause to become dead' the same way die means 'become dead.'

The theory of lexical decomposition, mentioned in our discussion of lexical studies, tries to break up predicates into such basic atomic predicates, in complex relationships with one another. The work of Postal (1970b), McCawley (1968a and b), Ross (1969, 1972a, 1974), G. Lakoff (1968a and b, 1971a and b), and R. Lakoff (1968, 1969, 1971b) has been seminal in this field, and a host of others have contributed: Morgan (1969), Green (1969, 1971), Binnick (1969), Borkin (1972), Lawler (1972b), Rogers (1974), and Dowty (1972), to name a few. While few linguists now espouse lexical decomposition in its more extreme form, this research represents a great body of interesting and useful generalizations about the interrelationships of predicates and therefore of their meanings.

Relevance of Logical Studies to Bilingual Education

There are many notions treated in logic that are of sufficient importance to permeate the whole of semantics, like predication or negation. However, while considerable research on logical topics continues to be pursued, it does not seem to me to be headed in a direction which will lead directly to usable insights in the near future (see Lawler 1973c).

CONCLUSION

Research in linguistics, particularly in semantics and its allied fields, has developed several heterodox research methods which tend to have peculiar effects when one tries to apply results to other fields. Other fields which deal with human behavior (psychology, education, sociology) have resorted to numerical methods to state conclusions, since the data are so numerous and perverse, and represent thousands of interrelated variables. Linguistics, by and large, has not opted for such a treatment; instead, there is an implicit reliance on intuitive investigations of situational and linguistic variance. When properly carried out, such methods can result in generalizations of great explanatory power and potential usefulness, but they cannot give numerical criteria for application: it is a research of qualities, not quantities. Consequently, it is very difficult to judge whether the conditions for the application of any generalization actually obtain, since these conditions are a matter of subjective judgment.

This incommensurability of methods and results has led, in the past, to a lack of communication between linguists and other social scientists, and to a lack of general application of linguistic findings. This need not be the case. In the research I propose, it is important that linguists and educators work together, especially on the second and third of the major agenda items; this will allow the necessary communication of ideas and will result in the research being targeted more exactly to usable results.

Proposed Research Agenda

Basic research and nontechnical reviews. First in terms of temporal priority on this proposed research agenda is more basic research in semantics and allied fields and better presentation of the current state of affairs. Clearly, without a continuing base of creative research, a field will stagnate. There should be a mix of empirical, data-oriented research as well as the more traditional intuitively based work. Such a mix should help to bring a focus to practical problems which education faces.

The second point is somewhat obscure: I refer to the pointless obfuscation which mars the literature in so many places. This is an artifact of the theoretical preoccupation of linguists, and the necessity linguists have felt of dealing primarily with theoretical topics to the exclusion of adequate explication of the data. This can be remedied in several ways: more reviews like the three in this volume should be undertaken (with much reduced scopes) with a view to explaining in nontechnical language the findings of particular areas of linguistics. The work of Fillmore, for example, or Bolinger, shows that it is possible to deal with complex topics in an intelligent manner that is comprehensible to those outside the speciality, and to give detailed, relevant accounts of linguistic facts. A series of papers summarizing various areas in semantics and pragmatics, presenting the data and noting the interactions fully (rather than sampling them, as I have been forced to do here) would be valuable to linguistics, as well as to education and other disciplines.

Language in teaching. Second on the agenda, and hopefully benefitting from the efforts of the first item, is some serious research into the use of language in teaching. There has, of course, been considerable investigation of teaching methodology, but very little of this has been carried out with any sophistication in semantics or pragmatics. Before we can deal with the questions that plague bilingual education, we need to know the answers to a lot of questions about more typical kinds of teaching. For example, how do good teachers use various types of speech acts? What is the mix of questions to statements? How much indirectness is used, and what is it used for, and how efficient is it? What presuppositions are evident in classroom language use? How does vocabulary choice affect effectiveness of communication? And what is effectiveness, linguistically speaking? Many other questions spring to mind--these are just a few. In pursuing this research, it is essential, as I mentioned above, that linguists and educators work together, so that

the results have some uniformity with the concepts of semantics and so that they may be applied in the comparative studies described in the next agenda item.

Interaction of language use, meaning, and bilingual classrooms. Third, and most closely targeted, but last in temporal terms because of the prior research necessary, is the examination of how language use and meaning interact with the day-to-day activities of bilingual education. How much, for example, of the cultural factor in one language overlaps and/or interferes with that in another in an educational setting? Does the fact of teaching or learning in one language, representing a different culture with different pragmatic and semantic conventions, influence motivation? Can interference from a linguistic source be misconstrued by the teacher as boredom, troublesomeness, or ignorance? What effect do different sets of presuppositions, discourse structures, lexical choices, and other matters of meaning have on teaching and learning? How should teaching methodology be altered to capitalize on the similarities and to deal with the differences?

There are, to be sure, many questions. Armed with some answers, we can proceed to implement bilingual education programs with some hope of success.

FOOTNOTES

[1]Morpheme is defined as the smallest meaningful unit of a language. See Zwicky (this volume) for a further discussion of morphology.

[2]Subjective grammaticality judgments are traditionally expressed by notations before the item under discussion. The scale of (un-)grammaticality runs from no notation:

(i) She's beautiful. (which is judged "grammatical")

to an asterisk (*):

(ii) *Furiously ideas colorless sleeps green. (which is judged "ungrammatical")

Intermediate levels are expressed by the following series:

(iii) ?*, ??, ?.

These judgments represent the author's estimate of the degree of difficulty in imagining a context in which the sentence could be used conventionally. They thus tend to vary with author interest and imagination. By convention in the field, it is considered bad form to disagree about grammaticality judgments, since it is recognized that they are intuitional.

[3]As this review was being prepared for press, a massive revision and formalization of relational grammar by Johnson and Postal was being circulated under the title *Arc Pair Grammar*. It is too early to assess its impact on the field of syntax, let alone semantics, but it appears to me to have the potential for a very interesting structural theory of semantics and pragmatics.

The First Few Years: Language Development Prior to Public School

Deborah Keller-Cohen

INTRODUCTION

This article presents a view of the linguistic tasks which children undertake during their first five years. The discussion is designed to review literature relevant to professionals involved in education. Not intended to be exhaustive, it is aimed at providing a general view of the language skills a child starts to develop--skills that are the focus of language instruction in the primary grades. Providing illustrative examples only, the review also tends to be English oriented, since it is designed for teachers of native or non-native English speaking children. As no prior knowledge of linguistics is assumed, where appropriate some of the basic linguistic concepts covered in this article are defined.

The discussion is divided into two major sections. The first examines children's strategies for interpreting and producing language which give them the appearance of possessing greater linguistic knowledge than they actually have. It is important to become aware of these strategies if we are to understand the limits of a child's linguistic system in the early stages. The second section looks at some of the principal linguistic tasks children face during the pre-school years which become the focus of language lessons during elementary school, i.e. learning the meaning of words, discovering rules for combining morphemes into words, and acquiring rules for sentence formation. (For a review of the development of conversational and pragmatic skills, see Keller-Cohen 1978a.)

STRATEGIES IN LANGUAGE DEVELOPMENT

Introduction

Learning to talk is a child's most impressive achievement during the first few years of life. The apparent ease and speed with which this takes place has often led scholars to speculate that children may come equipped with innate mechanisms specifically designed for this task. More recent research, however, suggests that children's success may be more apparent than real, that is, they may have tactics for interacting with others and interpreting their speech that are grounded only partially in a real understanding of linguistic relations. For example, mothers often report that their child knows the meaning of a particular word, yet under experimental conditions, the same child responds inappropriately to that word. What could account for this discrepancy? A brief story leads us to a solution.

Pfungst (1911) writes about a German gentleman, Heir von Osten, who claimed to have taught his horse, Hans, to perform all sorts of arithmetic operations. It seems that von Osten had taught Hans to communicate his answers through hoofbeats, i.e. Hans tapped his hoof until he had produced the number of taps corresponding to

*I am grateful to John Lawler for comments on an earlier version of this article.

the number in the answer. Eventually the horse was able to multiply and divide in addition to adding and subtracting. He could even make computations involving fractions, first tapping the numerator, then the denominator. As Hans' reputation spread, scholars came to investigate these feats. An initial investigation showed no deception to be involved. Indeed, Hans seemed to have an extensive knowledge of arithmetic operations and was even able to spell, using an elaborate system of hoof-beats. Despite the initial confirmation of Hans' abilities, subsequent inquiry uncovered the truth. Apparently, Hans had developed the ability to pay attention to the gestural behaviors of his questioners. Quite unconsciously "when the questioner asked a question, he assumed an expectant posture which was maintained until Hans had tapped out the correct answer. The questioner then relaxed his posture and Hans stopped tapping (Brown 1958:174)." As proof of this, one questioner intentionally relaxed at the wrong time, and Hans erroneously stopped tapping his hoof. So, what seemed to be quite advanced knowledge of mathematics was actually a simple strategy for paying attention to people's gestural cues.

Now, how does this relate to explaining why a child appears to understand a word at some times and not at others? Picture the following. A mother is in the living room reading, and a bookmark and a pencil fall from her lap. Both objects happen to land equidistant from her daughter, who has been playing at her feet. The mother bends over, pointing to the bookmark, and says, "Julie, hand me the bookmark please." Julie follows her mother's gesture, picks up the cardboard bookmark, and hands it to her mother. Her mother argues later that Julie must have known the meaning of the word, since she retrieved the bookmark and not the pen. To explore this, we would repeat the interaction several times, using a variety of objects, asking the mother to gesture in some cases and refrain from gesturing in others. We find that the probability of Julie selecting the correct object is greatly increased by her mother's gesture. Like Hans, Julie has arrived at a strategy for responding to speech that makes her seem to know more than she actually does.

Children also have strategies for talking that enable them to interact even though they may lack the necessary linguistic knowledge. An example from adult interaction illustrates this. Suppose you are a guest at a cocktail party in honor of a distinguished scholar in your field. You have waited anxiously all evening in hopes of an opportunity to talk with her. Finally, a friend introduces you. To your surprise, she begins talking about her hobby, weaving, and not about professional matters. Even though you have hobbies of your own, you know absolutely nothing about weaving. In fact, you've always been a sports fan, never finding fibre arts interesting. What can you do? One alternative is to make an excuse and politely leave. Another is to try your best to look intelligent, saying enough to keep the conversation going without revealing your ignorance. One way to accomplish this is to repeat part of what your interlocutor says, occasionally adding a word or two, as illustrated in the following conversation:

Guest: I generally weave using warp-way stripes.
You: Oh, warp-way stripes.
Guest: They have wonderful dynamism, yet such simplicity.
You: Yes, dynamic yet simple.
Guest: The color possibilities seem almost limitless once you've mastered the basic technique.
You: Limitless possibilities!

Certainly your contribution is less than spectacular, but it gives your interlocutor the impression that you understand more than you really do. Moreover, your contributions comply with basic conversational rules: take your turn and be relevant.

Conversations between adults and children are replete with exchanges like the above dialogue. The child with limited linguistic skills often repeats part or all of another's speech (Keenan 1977 and Scollon 1976). This enables children to stay in the conversational game, so to speak, and gives you the impression that they understand considerably more than may actually be the case. This does not mean that each time children repeat another's speech, they are intentionally using this conversational strategy. Rather, it points out that children do have this tactic

available as a vehicle for participating in interaction, even though their linguistic skills are limited.

Interpreting Words and Sentences

A good deal of children's early language behavior is influenced by their knowledge of the world. Children's early experience with objects and events, their experience with the tactile world, provides an essential foundation for their eventual acquisition of the linguistic code. Evidence of the role early experience plays can be found in studies of environmental deprivation. The famous Genie case (Curtiss 1977), a tragic story of child abuse, illustrates this. A female child was restrained in her room for over 13 years with virtually no exposure to speech. She was not free to physically explore any aspects of even her most limited environment, nor did she receive much, if any, linguistic input. When Genie was taken into protective custody and subsequently began acquiring language, her first utterances made clear the devastating effect of her early experiences. In contrast to normal children, whose early words refer to dynamic aspects of their environment, some of Genie's first words were color terms. Quite clearly, she had been prepared developmentally for observing rather than interacting with her world.

The following section explores how children use the knowledge they have acquired outside of language to participate in the linguistic world. Particular attention is focused on the use of extra-linguistic strategies for interpreting words and sentences, as a view of this is central to an understanding of what children know when they respond to the speech of others.

Strategies for Interpreting Words and Sentences

By the time children are six years old, they have learned at least 14,000 words (Carey 1978). Simple calculations reveal this is a rather formidable daily task. Even though American parents often teach their children words in the context of reading picture books or other types of *focused interaction* (Goffman 1963), these activities could not account for most of the words children learn. In fact, research in recent years suggests that children have access to a variety of strategies for responding to words, and that their resulting responses are then available as initial hypotheses about the meaning of a word. The following discussion sketches what some of those early strategies are.

Normal states. Although children make a vast number of discoveries about the world in their early years, they also experience a great many things over and over (Nelson 1977). Children practice opening boxes, pulling trucks, and throwing balls many times during these first years. This repetition is essential if children are to acquire the ability to form generalizations about the structure of their world. The theories children form are available to them when they are faced with the task of interpreting language. As such, they are expectancies children have about the way the world is organized.

Recent work makes it clear that children use these generalizations when responding to the speech of others. In one study, Clark (1973b) examined children's understanding of the spatial prepositions in, on, and under. She asked children to place toy animals in relation to stationary objects such as toy trucks, bridges, and tunnels. If an object was a container, such as a truck or crib, young children placed the toy animals IN the object, regardless of the actual preposition in the instruction. That is, they relied on their knowledge of how one typically interacts with containers to interpret sentences with spatial prepositions.

In a related study, Clark (1977) asked children to perform actions describing directional movements, such as Make the toy go up/down the slide. She found that the majority of errors for up involved moving a toy animal in the conventional way on the slide, i.e. pushing it down the slide. Additionally, similar investigations by Wilcox and Palermo (1974) showed that the impact of conventional relations on children's interpretations increases with age.

Further evidence for this strategy can be found in children's interpretations of sentences describing temporally related events, such as The boy blew out the candles before he ate the cake. In one study, Keller-Cohen and Bogen (1979) presented three- to five-year-old children with sentences describing familiar events, some in

their conventional order, e.g., After the boy poured the ketchup he ate the hot dog, others in reverse of their natural order, e.g., The boy ate the hot dog before he poured the ketchup. They found that three-year-olds performed poorly on the reverse order sentences, dramatizing them in the order they expected, that is, in the conventional order.

Strohner and Nelson (1974) presented children with several types of sentences: actives and passives describing events that are congruent with a child's experiences (The boy jumps the fence; The fence is jumped by the boy), and improbable actives and passives, that is, sentences describing events that are incongruous with a child's experience (The fence jumps the boy; The boy is jumped by the fence). They found that two- and three-year-olds were strongly influenced by the conventionality of events. Thus, they correctly interpreted probable actives but performed poorly on sentences with improbable actives. Support for this also appears in Bever (1970), Chapman and Miller (1975), and Slobin (1966).

Thus, we have considerable evidence that children interpret language in accordance with their expectations about the way objects and events are typically related. Since they often hear speech describing relations of this sort, they can use the normal state strategy with considerable success. However, as children grow older, their world increases in both size and complexity, and with this diversity comes less predictability. Classroom lessons, vacations, and increasing numbers of new acquaintances eventually limit a child's reliable use of this strategy. These factors, among others, are an impetus for more sophisticated language development.

Use of the immediate context. Much of the language directed at children makes reference to people, objects, events, and relations in the here and now (Bloom 1973, Brown and Bellugi 1971, de Villiers and de Villiers 1978, Remick 1971, and Snow 1972). Thus, it is not surprising that children pay considerable attention to what is around them; in particular, there is abundant evidence that children notice the dynamic rather than the static aspects of their environment. Children's choices of lexical items and the semantic relations in their early word combinations describe agents and moveable objects in active rather than static relations (Huttenlocher 1974 and Nelson 1973). Others report that children talk about action events before they describe stative relations (Bloom et al. 1975 and Bowerman 1975).

How do children make use of this information from their surroundings? Moreover, how does their knowledge of conventional relations interact with this? A report by Shatz (1978) suggests an answer. She was interested in children's procedures for responding to language. To this end, she examined two-year-olds' interpretations of direct (Fit the ball in the truck) and indirect (Can you fit the ball in the truck?) requests. She found that the children appeared to interpret correctly all the utterances as requests, responding by putting the ball in the truck. Even so, Shatz observed that children of this age are not likely to have the pragmatic and syntactic knowledge necessary to distinguish different types of requests. Instead, she argues that children use an action strategy to respond, carrying out a conventional action with the objects mentioned in an utterance. In this way, children combine their preference for attending to dynamic features of their surroundings with their knowledge of probable relations to arrive at a heuristic for responding to the language they hear. This strategy does not require that children know the syntactic rules for word combination, nor does it entail that they have analyzed pragmatic constraints on different types of utterances in order to respond appropriately.

Another dynamic feature of the immediate environment which children attend to is gestures. Because speech to children is about the here and now, it is often accompanied by gestural support. Adults point to, offer, and show objects to infants to attract their attention (Escalona 1973), and their gestural repertoire becomes more elaborate as their child grows older. Lempers et al. (1977) found that children around a year to a year and a half could recognize the attention-directing function of gestures. Gesturing is an essential key to unlocking the linguistic code, since it limits the range of things a child need pay attention to in the immediate environment.

Children's reliance on gestures as clues to meaning is demonstrated in a large scale investigation by Macnamara (1977), who was interested in the effect of gestural information on children's interpretation of speech. In one study, an adult showed children between 14 and 20 months pairs of objects and asked them to locate

a particular object. The adult always held out one of the pair and simultaneously named one of the objects. In some instances the adult's message and the object shown to the child were congruent; in other cases there was mismatch.[1] Macnamara found that children selected the appropriate object when the gesture and words matched. However, when mismatch occurred, children chose the gestured object. That is to say, children relied on the gestures rather than the message to respond to the adult's request.

The studies cited here clearly show that children rely extensively on cues from their immediate surroundings to respond to the speech of others.

Motoric simplicity. Despite the impact that knowledge of normal relations and the immediate context have on a child's understanding of others' speech, additional factors influence how children respond to the language of their environment. Several studies suggest that children may be affected by the ease with which an action can be performed, and that this limits the range of responses they may make. The methodology employed in these studies typically requires that a child place two objects with respect to each other, e.g., putting one block on another or placing one mobile toy near another (Dewart 1975 and Huttenlocher and Strauss 1968). This research reports that one of the strategies some children use is to produce a relationship between the objects using the least possible motor effort. Thus, in a study by Wilcox and Palermo (1974), two-year-olds tended to perform better when asked to place a strip of toy road IN a truck rather than UNDER it. In a series of related studies, Huttenlocher et al. (1968) and Huttenlocher and Weiner (1971) had children hold one of two toy trucks in their hand and asked them to place the trucks in relation to each other, as in The red truck pushes the green truck. They found that children were more accurate in responding when the truck in their hand was the agent of the action than when it was the object, that is, if a direction required that the child put down one truck and retrieve the other, there was a tendency to opt for the motorically simpler response. As such, this strategy may interact with other procedures children have for responding, and may make children seem to understand (or fail to understand) the language they hear.

We have seen that children make use of a variety of heuristics for responding to the language of their environment. Ultimately, however, a child learns the rules for using words, combining morphemes into words, and organizing words into sentences. By the time children enter the public school system, they know a great deal about the structure of the linguistic code and how speech is used.

No review could hope to present a complete picture of what comprises a five-year-old's linguistic system. Thus, in the remainder of this article I will sketch some of the central accomplishments with which a five-year-old can be credited and will consider some of the ways in which the child acquires these skills.

SOME MAJOR MILESTONES IN LANGUAGE DEVELOPMENT

Learning to Use the Linguistic Context[2]

If children are to acquire language, they must become increasingly sensitive to the speech of others. This means not only learning to pay attention to what is said to them, but also modifying their own linguistic and non-linguistic behavior as a result. Before we can attempt a discussion of the development of linguistic skills in particular areas, such as semantics or morphology, it is important to consider just how children come to make use of the language of their surroundings. In the next portion of this report, I will consider, therefore, some of the major steps in learning to use the linguistic context.

Paying attention to the linguistic context: Early development. For children to attend to speech, they must learn to differentiate it from the more general system of sounds in their environment. Neonates hear rattles, snaps, buzzes, rustles, barks, and chirps in addition to the speech sounds of their environment. Research on neonatal response to sound shows that even in the earliest months of life, infants differentiate human speech from other environmental sounds.[3] Measures of autonomic behaviors such as non-nutritive sucking and heartbeat rate show that infants respond differentially to speech than to other sounds. Apparently the neonate is particularly sensitive to sounds that have the pitch of human speech

(Hutt et al. 1968).

Responding to the linguistic context. Attending to speech is only the first step. If children are to become speakers of their language, they must learn to respond verbally. Long before children produce their first word, they have evolved a vocal system for interacting with their environment. Recent research suggests that the structure of early mother-child interaction provides a child with a structural system supportive of child responses. In a longitudinal study of mother-infant interaction during the first 18 months after birth, Snow (1977) observed that mothers' speech to their children seemed to be aimed at eliciting responsive behavior from the child. Long before a child could talk (at three months of age), mothers produced speech in response to any child behavior, including any vocalization, smiling, and even burping! They also spent a good deal of time trying to elicit particular responses from the children. By seven months, mothers were selective in responding to infant vocal behavior, replying only when the children produced high quality vocalizations. Thus, this very early system of interaction seems to provide particular support for infant responding.

Once children begin to talk, they continually expand their repertoire of devices for responding. Donahue (1977) and Hoffer (1975) observed that children around two years old acknowledge their interlocuters by using prosodic fillers, a particular type of phatic device,[4] to let interlocutors know their messages have been received. Similarly, Keenan (1974 and 1977) found that children sometimes use phonologically similar speech such as sound play or repetition to signal receipt of a message.

Paying attention to the linguistic context: Later development. Having passed through the pre-verbal stage, a child learns to attend to the content of others' speech. This causes a child to arrive at different interpretations of the same utterance, depending on particular features of the preceding linguistic context. Recent research by Dewart (1975) illustrates this. She examined the influence of the linguistic context on children's interpretations of semantically reversible passive sentences (where either noun in the sentence could function as the agent or object, as in The dog was bitten by the cat). Previous research has shown that young children do a rather poor job of interpreting such sentences, responding to them as actives (e.g., The dog bit the cat). In one study Dewart presented three- and four-year-olds with passive sentences in three environments: (a) no context; (b) prior context that was congruent with the information in the passive (e.g., Poor duck. The duck is bitten by the monkey); (c) prior context incongruent with the passive (e.g., Poor duck. The monkey is bitten by the duck). Those children who responded incorrectly to the no-context passives were found to be greatly influenced by the preceding context in the remaining two conditions. When the context was incongruent, they responded erroneously 90 percent of the time. Yet when the context matched the passive, they failed only 63 percent of the time.

In a related study, Shatz (1978) presented children above and below a MLU (mean length of utterance in morphemes) of 3.0 with sentences that could be interpreted as directives or requests for information. These sentences were embedded in two types of contexts: a set of sentences that were directives and a set that were requests for information. She found that the linguistically advanced children were more likely to interpret sentences in informing sets as requests for information than were children with a lower MLU. Thus, with increased linguistic development, children become increasingly influenced by the prior linguistic context.

Modifying your speech according to the linguistic context. Children learn a host of rules for adjusting their speech according to the prior speech of others. Several major accomplishments are sketched below.

Making your speech relevant. Children who acquire linguistic skills without learning that their speech must be relevant to their interlocutor's would undoubtedly be considered deviant. One of the milestones in making use of the linguistic context is the awareness that your verbal contributions must be relevant to preceding speech. Even though children develop the necessary skills to respond to the speech of others, it is some time before their comments are informationally tied to their interlocutors. Bloom et al. (1976) observed the growth of this ability in a longitudinal study of four children. They found that as the children's utterances grew in length, there was a significant increase in the relative frequency with which their speech shared the same topic as a prior interlocutor utterance.

Acknowledging prior information. Growing sensitivity to what has already been said in a conversation is an integral part of developing linguistic competence. If children do not give appropriate recognition to what other people say, their interlocutors may be unable to determine whether they have correctly interpreted their message. As such, children must learn the conventions for signalling previously stated information. Languages have a wide variety of such devices, including definite articles, anaphoric pronouns, ellipsis, and contrastive stress (see Halliday and Hasan 1976). Children's speech is, at first, highly redundant, displaying little evidence that they can linguistically differentiate previously introduced information from new information. They repeat nouns rather than using anaphoric pronouns (Ervin-Tripp and Miller 1977), and they often omit devices such as the definite article even though they are talking about a previously mentioned referent (Dunlea 1978). Eventually, however, children acquire a system which includes signals for referring to information already introduced in a conversation (Bloom et al. 1976). They understand the meaning of devices used to express old information and arrive at varying interpretations of utterances depending on the presence of these cues (MacWhinney and Bates 1977 and Maratsos 1976).

Repairing your speech. Further evidence that children are both influenced by the linguistic context and are modifying their speech as a result of it is their awareness of sources of difficulty in their own speech or someone else's and their ability to repair these difficulties.

Stokes (1977) examined how eight children between 20 and 48 months responded to their own communication failures as evidenced by listener misapprehension. He found they were able to examine sources of error in their own speech and apply a wide range of linguistic devices to repair them. Other research suggests that there may be a developmental change in the kinds of repairs children make (regardless of whether they are corrections which they spontaneously initiate or which are initiated by others). Phonological detail seems to be the first area of correction, with lexical and morphological repairs the result of more sophisticated language development (Clark forthcoming). This seems reasonable if one considers that children can only correct linguistic material they have some command of.

Learning about the Meaning of Words

The developments outlined above are illustrative of some of the ways in which children come to make use of and be influenced by the linguistic context. Our next task is to consider some of the major accomplishments within particular domains of language development.

It is often thought that the central task facing children is learning the words of their language. Parents spend a great deal of time pointing out elements of their child's environment and labeling them. This occurs frequently during play and book reading, for example. However, the task of learning about the meaning of words is far greater than simply learning what a particular word refers to. Accomplishments in this domain are considered below.

Learning the lexical encoding of reality. From the moment of birth, children are exposed to a buzzing world full of sights and sounds, textures and smells. If they are to become speakers of their language, one of their principal tasks is to discover which aspects of their environment their particular language encodes (Bowerman 1979). For instance, Russian children must learn that their language distinguishes lexically between movement by foot and movement by a vehicle. Similarly, English speaking children must distinguish between the stationary location of a person (lie) and an object (lay).

This categorizing task is two-fold: children must determine which of the concepts they have acquired are represented linguistically and must discover which aspects of the environment the words they hear make reference to.

Often children's earliest references to their world are semi-words (Carter 1975 and 1978), that is, linguistic elements without the status of full adult words. This may be due in part to the fuzziness of the children's own concepts and in part to the primitive state of their phonological apparatus. Even when children begin to use true words, they may apply them both to appropriate and inappropriate referents (Anglin 1977, Leopold 1949, and Lewis 1959). Clark (1973a) and Bowerman (1976)

report numerous examples of children's use of words to refer to a broader range of referents than an adult would. For the most part, children seem to use their first words to refer to a class of perceptually similar objects or events (Anglin 1977), such as mooi (moon) to refer to the moon, cakes, round shapes in books, and the letter O (Chamberlain and Chamberlain 1904), or tick-tock to refer to clocks, watches, a gas-meter, and a bath scale with a round dial (Leopold 1949).

Children's early categorizations are sometimes considerably different from that of the adult. Segerstedt (1947, cited in Schlesinger 1974) observed a sixteen-month-old who used eat for all foods and cake for only those foods he could eat unaided. Similarly, Werner and Kaplan (1963) offer a report on a two-year-old who had one word for milk in a bottle and another for milk in a cup. A mistake such as this arises quite naturally out of the difficulty children have in determining which aspects of their environment are relevant linguistically. The problem includes not only isolating the particular object relation or action from the entire context, but also assessing whether any other features of the situation are relevant.

The process of categorization does not precede the acquisition of language. No child begins learning his language with a full theory of what environmental properties are relevant for the particular linguistic system of his culture. As we have seen, children's early sensorimotor experiences with objects and movements undoubtedly serve as the foundation for their initial hypotheses. Yet the linguistic system a child learns also constrains and suggests possible sets of generalizations (see Bowerman 1976 and Schlesinger 1977).

Learning the semantic relatedness among words. Discovering the features of the world to which a term refers is only one part of the formidable task of acquiring word meaning. Children must also discover that the meanings of various words are related to each other. The development of antonyms is a primary example of this. Here children must come to recognize that a particular dimension of the world is encoded linguistically (happiness, length, roundness, age) and that pairs of terms refer to opposite tendencies within a dimension. Some opposites are *gradable*, that is, they divide the universe according to the extent to which members possess a feature. Hot and cold are gradable opposites, since we can speak of the degree to which a particular object or person is hot or cold. Other pairs are *ungradable*, i.e. an element either possesses a feature or it does not, such as male and female, which are ungradable opposites.

By far the lion's share of attention has been to gradable opposites. These terms obviously present a challenge to any child, since they require judgments of the relative presence of a property. Children must first discover that two terms refer to the same slice of reality. The problem then remains to determine which member of a pair makes reference to a particular end of a dimension.

There has been considerable debate over the order in which members of an antonym pair are acquired. Some investigators (Bartlett 1976, Clark 1972, and Klatzky et al. 1973) report that children first learn the member of the pair which refers to the end of the dimension with greatest extent. Thus, big would be acquired earlier than little, tall before short, old before young, and more before less. Clark has argued that children have a perceptual bias that focuses their attention on the end of the dimension with the greatest extent, and that this accounts for which member of the pair is learned first. Another explanation is that children first learn the term that has the widest range of meanings. This means that a term such as old would appear in a child's speech before young does, since old not only describes the dimension with the greatest extent (He's very old) but also is used to elicit information about the number of units within the dimension of age (How old is she?). Despite these claims, other studies do not provide support for this order of acquisition, showing instead that children follow a variety of routes in fully distinguishing antonyms (Eilers et al. 1974, Townsend 1976, and Weiner 1974). Even so, it appears that at some point children assign the same meaning to both members of a pair. Perhaps this occurs when they recognize that both words are closely related semantically. It's clear, however, that organizing the semantic structure between members of an antonym pair is a particularly difficult task.

Another area of semantic development is awareness that whole groups of words refer to the same conceptual domain. Some of the more obvious semantic fields are spatial, temporal, kinship, and dimensionality (length, width, etc.). Discovering

this relatedness obviously represents a formidable accomplishment, since it means that a child has begun to recognize that entire series of words are semantically related to each other. In the past, researchers have thought that children's vocabularies do not become fully integrated semantic systems until the early elementary years (Anglin 1970 and Francis 1972). However, a recent study by Bowerman (1978) suggests that children may recognize very subtle kinds of relatedness among words at a much younger age than previous investigators believed.

Drawing on longitudinal data from observation of her two daughters during their pre-school years, Bowerman observed that, after a long period of correct usage, the girls began to make mistakes using certain verbs. She found they interchanged let and make, make and put, and put and give. Bowerman points out that the members of these pairs of verbs share some elements of meaning but differ in others. For example, put and give both describe an event where an agent intentionally causes an object to change location. One way in which they differ is that the recipient of put is generally inanimate, whereas the recipient of give is generally animate. Thus, the late emerging substitution errors in the children's speech suggest that a significant restructuring of their mental lexicons was taking place.[5]

Several properties of words seem to influence the acquisition of terms within a semantic domain--restrictedness, congruence with perceptual strategies, and conceptual simplicity (Keller-Cohen 1979). Many recent reports show that children first learn words that are the least restricted within a semantic field, that is, terms which have the broadest range of reference. For example, the dimensional adjectives big and small, which can be used to refer to one, two, or three dimensions, are learned before more restricted members of their field, e.g., wide, narrow, deep, shallow (Bartlett 1976 and Wales and Campbell 1970).

Words that are congruent with the perceptual strategies a child employs are also learned earlier than incongruent members of the same semantic field. For example, children serially process the temporal relation between events, and this is reflected in the temporal words learned first, e.g., and then is learned prior to while (Clancy et al. 1976) and at the same time (Keller-Cohen 1974).

The conceptual simplicity of a term also influences its order of acquisition within a semantic domain. One way of viewing conceptual simplicity is in terms of the number of relations it requires a child to understand: the fewer the relations, the simpler the term. For example, reference to a point in time (today, now) is learned earlier than reference to two points in time (____ and then ____) (Clark 1973a).

Thus, a number of factors influence how children discover the relatedness among words. However, there are particular problems associated with learning some exceptionally complex lexical sets.

Special problems of learning the meaning of words. The following briefly touches on a few particularly difficult aspects of lexical development.

Learning the meaning of words with shifting reference. Some of the words children learn refer to a class of objects or relations with stable reference, such as cats, trucks, and dolls or kick, push, and throw. In contrast, other words shift reference and are termed *deictic* words. The particular person, action, property, or object to which a deictic term refers depends on such things as the identity of the speaker or hearer, their respective locations, and the time of an utterance or the time referred to in an utterance. The following examples illustrate this.

(1) Mary Smith is sick.
(2) I am sick.

In (2) but not in (1), the identity of the person referred to in the noun phrase depends on the speaker's identity. That is, no matter who utters (1), the person referred to is Mary Smith. However, the person referred to in (2)--I--depends on who has uttered that particular sentence. Other examples of terms which shift reference are here/there, come/go, now/today/yesterday, etc. The absence of stable reference makes these forms particularly difficult to learn.

In a series of studies, Clark and Garnica (1974) and Clark and Sengul (1978) examined the acquisition of deictic terms. Results showed that three factors influence how children go about formulating hypotheses regarding the meaning of

deictic terms: relation of person or object to the speaker, to the child, and to the goal of the action. For example, in one study it was found that the first deictic verb children learn is reference to the goal of the action (come rather than go). Support for the role of speaker and child in learning the meaning of deictic terms can also be found in related work. De Villiers and de Villiers (1974b) and Webb and Abrahamsen (1976) observed that children follow alternate routes in learning the meaning of this and that, some chosing themselves as the reference point, others chosing the speaker. (See also Charney 1979 for a study of here and there.) Apparently, pinning down the dimensions relevant to the use of deictic words is a formidable task which is not completed until middle childhood.

Learning unique reference. When children hear a word, they have to determine whether the word refers to a class of objects, such as tables or clocks, or to a single object. Upon hearing "Give the bone to Rover," they must have a way of discovering that Rover is the name of that dog only and not every dog. Katz et al. (1974) suggest that children use the presence of the articles a and the to make this determination.

Discovering a new word and its meaning. In the preceding discussion, we did not consider how children make the initial determination that a word is a new lexical item and then go about discovering what it refers to. How does a child discover what stark is in Look at that! It's a very stark picture or that press in Let's press it very hard refers to an action?

Carey (1978) suggests that children are aided in this task by contextual and syntactic information. In one study, she examined how children learn a new word. The initial part of the experiment took place in a pre-school classroom. In one part of the room there were two identically shaped trays and two identical cups. One cup was red and one tray was blue; the other tray and cup were both olive green. In the study, these latter objects were referred to as the chromium tray and cup. While setting up for snacks, the teacher told a child, "Bring me the chromium tray, not the blue one, the chromium one" or "Bring me the chromium cup, not the red one, the chromium one." Although these instructions did not explicitly teach a child the meaning of chromium, the contrast between the two trays showed the child that chromium was a color, and the syntactic position of chromium further supported an interpretation of this word as a modifier. As for the exact color, the presence of a chromium tray provided evidence for that. Apparently the children made use of these clues, since of the 19 children who participated in the study, only one retrieved the wrong object.[6]

What people say about a word also gives a child clues to its meaning (Brown 1958 and Werner and Kaplan 1952). Thus, the statements that a tripod holds a camera, can be folded up, and has three legs give the child clues that the new word refers to an object with particular functions and properties.

Learning about the Composition of Words[7]

The preceding discussion has touched on some of the major achievements in the development of word meaning. Learning about words, however, does not stop with the discovery of what a word refers to, i.e. its extension, or learning its relation to other words. Children are also faced with the difficult job of decomposing words into their meaningful subparts, i.e. into morphemes.

The morphological systems of the world's languages consist of two general types of morphemes: those which can occur alone (*free morphemes*) and those which occur only in combination (*bound morphemes*). English content words such as tree, pull, fix, and table are free morphemes, since they can occur independently. Bound morphemes are generally those which serve grammatical functions, such as -s in plants and -ed in pushed, and these forms cannot occur independently.

Bound morphemes are classified according to how they are attached to the *root* morphemes (usually free morphemes such as cat or walk) that they modify. If a bound morpheme (an *affix*) precedes the root, it is termed a *prefix*, if it occurs inside, it is an *infix*, and if it follows, it is a *suffix*. In English many of our derivational affixes are prefixes, e.g., predecessor, impossible, reorganize. English does not make productive use of infixes,[8] although they are common in many of the world's languages. However, suffixes are a major grammatical device in English

and are used to indicate such meanings as plurality (apples), third person singular present tense (he goes), and past time (stepped).

Bound morphemes have either of two basic functions: *inflecting* or *deriving*. *Inflectional* morphemes express basic grammatical modifications in meaning. These include such things as changes in number (tricks), time (danced), and ownership (Gertrude's). Generally, *derivational* morphemes are used to change the class to which a word belongs.[9] For example, -er in English is used to change a verb to a noun denoting a person or thing who (or which) carries out the action of a verb (teach→teacher; mow→mower). Similarly, -ful changes nouns to adjectives (hope→ hopeful; pity→pitiful).

Learning the structure of inflectional morphology is considerably easier in English than in most other languages. The major inflectional morpheme added to English nouns is -s, which indicates plural number. So we speak of crayons, hair dryers, and pots. However, some nouns require special kinds of pluralizing forms in addition to the plural morpheme. For example, we can say five peas but must say five grains of rice. Similarly, we can say two pencils, but we use two sheets of paper (two papers refers to larger written products, such as newspapers or term papers). There are also some nouns which do not assume a plural form. Nouns which can be pluralized are termed *count nouns* (peas, shoes, toothpicks, pickles) and those which cannot are called *mass nouns*. Nouns which are treated as uncountable in English include milk, butter, rice, steel, and jam. In order to refer to additional quantities of mass nouns, we use other forms such as more (more butter) or numbers plus partitives (words indicating precise quantities of mass nouns, such as *two quarts* of milk or *seven tons* of steel).

Another distinction some languages make in regard to nouns is *gender*, a linguistic distinction which arbitrarily assigns a "sex" to a person, place, or thing. The gender of a noun may (the *book-it*) or may not (the *boat-she*) correspond to the actual sex of the referent. In Russian, for example, each noun belongs to one gender class, indicated by the presence (or, in the case of masculine nouns, by the absence) of a suffix on nouns (stol 'table' [masculine]; kniga 'book' [feminine]; okno 'window' [neuter]). In English, gender shows up only in our pronoun system (he, she, it).

Verb morphology is more complex in English than noun morphology. Even so, it is a great deal simpler than that of many other languages. The verb systems of all languages typically have a set of devices for describing the conventional temporal relationship between a particular utterance and the event described in that utterance. We talk about events that have already taken place, events that are currently happening, and events that are yet to take place. The linguistic system we use to talk about time is referred to as the *tense* system.

The tense system of any language is tricky to understand, since a given tense has a variety of uses, not all of which refer to the same time. For example, in English if we want to describe an event in a baseball game that is in progress, we might say He *is running* home. However, if we talk about a friend and say She *is having a baby*, we do not necessarily mean that she is delivering the baby at that particular moment. We use this verb form--be + Verb + ing--to mean that an event is imminent. Similarly, we use the simple present tense to describe habitual actions, such as He *runs* to work every day or The plane *leaves* for New York at 5 p.m., even though these actions may not be taking place at the time of the utterance. However, we also use the same form to refer to an event that has already taken place (John *tells* me that you sold your house) or to refer to one that is imminent (I *leave* for China next week).

Another set of verbal distinctions an English-speaking child learns is termed *aspect*, which describes a speaker's view of a variety of different properties of actions. To illustrate this, consider some examples from English. English uses changes in verb form to contrast an action in progress with one that has been completed, i.e. She *is writing* her paper now as opposed to She *has* already *written* her exam. Similarly, English distinguishes between habitual actions (Jane *dances* well) and activities that are actually taking place at the time of an utterance (Jane *is dancing* well today); it also distinguishes between the onset and termination of an action (She *began laughing* and She *stopped laughing*).

Some Factors Influencing the Acquisition of Morphology

Before examining some of the ways children go about learning the morphological system of English, it is useful to consider some factors which may influence the general acquisition of morphology.

Frequency. Frequency may play a role in a child's discovering the meaning of a particular form and the constraints on its use. Consider children learning -ed, the past tense morpheme. It seems reasonable that the more often they hear the past tense, the more likely they will be able to form an accurate generalization about what it means and how it is used. Evidence for this from other domains is that high frequency words such as and tend to be learned early (Bloom et al. 1978 and Clancy et al. 1976), while low frequency syntactic patterns such as the passive are learned late (Baldie 1976, Beilin 1975, and Horgan 1978).

In contrast, however, other work casts doubt on the major role frequency is thought to play. For example, in examining the relationship between the order in which three children acquired 14 grammatical morphemes and the frequency of these forms in the speech of their parents, Brown (1973) found that the two were not reliably correlated. Similarly, Cazden (1968) found that although the regular possessive (That is John's book) is 7 to 20 times more frequent than the elliptical possessive (That is John's), the latter appears first in children's spontaneous speech. These findings do not rule out the possible impact of frequency, but they do suggest that other factors must also play a role in acquisition. Moreover, even if frequency is found to be related to ease and order of acquisition, it is not an explanation in itself. One must ask why a particular form has a high frequency, that is, what function does it serve that would lead to its frequency.

Complexity. There are many different views of what makes one form more complex than another. The meaning of a grammatical morpheme may be more difficult to discover if it is conceptually complex, i.e. if the relations underlying its use are not easily grasped. For example, learning to apply the plural essentially entails discovering that it refers to more than one thing. However, the acquisition of the auxiliary requires discovering temporality, duration, and number. This may explain why the plural morpheme is learned earlier than the auxiliary (Brown 1973). Similarly, although children use definite and indefinite articles in the pre-school years, the conceptual distinctions underlying their use are so vast that they are not fully understood until the elementary years (Maratsos 1976).

Formal complexity may also play a role in acquisition. Slobin (1973) argues that a morpheme that has one location, such as a prefix, infix, or suffix, is easier to learn than one with more than one location simultaneously, i.e. a discontinuous morpheme. For example, in Egyptian Arabic one form of the negative morpheme is discontinuous, as in (3) below, whereas another form is continuous, as in (4):

(3) ma - huwā - š kæbir
he big 'he is not big'
not

(4) huwā miš kæbir
he not big 'he is not big'

Omar (1970) found that Arabic-speaking children acquired the continuous allomorph miš earlier than the discontinuous form. In English there are two forms of the present tense, the simple--He *goes*--and the progressive He *is going* (a discontinuous morpheme). Not surprisingly, children acquire the continuous form earlier (Brown and Fraser 1963). Thus, the particular structural features of a morpheme may also account for the difficulties a child has in learning it.

Salience. Another factor that may play an important role in the acquisition of a morpheme is its perceptual salience (Cazden and Brown 1975). Two types of "visability" that may influence learning are considered below.

Location. The position in which a morpheme occurs may contribute to the ease with which a child identifies and learns it. We have already observed that bound morphemes occur in one of three places with respect to a free morpheme: preceding it (prefix), inside it (infix), or following it (suffix). There are other

grammatical morphemes which are not affixed to free morphemes but nevertheless precede or follow them. These forms also have a close semantic relationship to the major morphemes. In English some forms precede nouns and modulate their meaning; these are termed prepositions. Other languages, such as Japanese, have similar forms which follow nouns, and are thus termed postpositions.

There is some evidence to suggest that forms which precede a word or a free morpheme are learned later than forms which follow these major morphemes. That is, prepositions and prefixes seem to be learned later than postpositions and suffixes. For example, Slobin (1973) notes that the expression of location in the verb particle system (pull *off*, pull *on*) is learned earlier in English and German, where the location is a postposition, than in Polish, where it is a prefix (Shugar 1971). This is also supported in a more recent study by Kuczaj (1979) where children were taught contrasts in an artificial language.[10]

Syllabicity. A morpheme that is a full syllable, such as -ing in running, may be more easily perceived than one which is not, such as -s in runs. Indeed, many investigators have found that children learn the present progressive -ing (she hopping[11]) much sooner than the simple present -s (he skips) (Brown 1973, de Villiers and de Villiers 1973a, and Kuczaj 1977). Support for this can also be found in reports of bilinguals' language development, where a particular concept is not expressed at the same time in a child's language development because of the difference in perceptual saliency of the forms in the respective languages. For example, Slobin (1973) found that Hungarian/Serbo-Croatian bilingual children acquire the Serbo-Croatian syllabic accusative morpheme -u[12] earlier than the corresponding form, the non-syllabic -t, in Hungarian.

Despite the apparent assistance that syllabicity gives the child in recognizing a morpheme, a particular syllabic morpheme must also be easily distinguishable from the rest of the word for it to be regarded as salient. For example, Berko (1958) and Bryant and Anisfeld (1969) found that children learned the syllabic allomorph of the English plural /ɪz/ much later than the non-syllabic allomorphs /s/ (as in socks) and /z/ (as in shoes). Since the syllabic allomorph /ɪz/ is used on words ending in fricatives and affricates such as š and č, a child may believe it is part of the word and thus not identify it (Derwing and Baker 1977). Therefore, the linguistic environment in which a seemingly salient form occurs may obscure its presence.

Redundancy. A prominent feature of language is its redundant encoding of information. By including the same information more than once, a language increases the probability that its messages will be successfully received and understood. Successful receipt is threatened by interference from the environment and lapses in performance by the speaker or the receiver. Thus, redundancy maximizes successful message transmission. In English, for instance, we redundantly encode number. The utterance two shoes includes two signals that the number of shoes is greater than one: two and the plural morpheme -s.

Some investigators suggest that children are late in learning grammatical forms that convey information already expressed elsewhere in a sentence. If two morphemes express the same relation and if they co-occur in sentences, children may first learn only one device for expressing a particular relation. Learning the two morphemes of the present progressive (He *is* runn*ing*) follows this pattern. At the start, children encode this relation using only one of the morphemes: -ing. The use of both morphemes in the same utterance does not occur for many months (Brown 1973, Cazden 1968, and Menyuk 1969). Here, we are not explaining why one of the morphemes is learned earlier than another. Rather, our intention has been to provide a tentative account of why two co-occurring morphemes which share the same function tend not to be learned simultaneously.

Learning about Morphology

The preceding discussion points out some of the factors which may influence the course of development children follow in learning English morphology. Next I consider some of the general features of learning morphology.

Segmentation. Before a child can begin to analyze fully the function of a particular morpheme, he must first discover its form. This is the same problem

a linguist faces in beginning work on an unfamiliar language. He must look for *recurrent partials*, that is, pieces of language that recur in many different linguistic environments. This is obviously no small feat, particularly insofar as grammatical morphemes are concerned, since they are unstressed (húnted not *hunted) and thus are not terribly obvious. Even free morphemes are not necessarily easy to recognize, since they do not occur with major pauses around them. Moreover, the linguistic context of nouns, for example, can be particularly deceptive, as is illustrated in the following example. The son of one of my colleagues was playing particularly rough one day. His father observed, "You're really being aggressive today, aren't you." The next day the child was worse. This time, however, the boy made his own observation, declaring, "Today I'm being a mean gressive." Anyone listening closely to children reciting the pledge of allegiance will recognize the magnitude of the segmentation problem.

Brown (1973) suggests that children may be sensitive to two linguistic properties which enable them to segment the speech stream: open juncture (symbolized as +) and frequency. Open juncture is a construct linguists use to refer to the slight pause between many morphemes, as in mark + it in contrast to market (which does not have open juncture). In addition to the pause, the consonant which precedes open juncture has slightly different phonetic features than one not preceding open juncture, and as such may also be a clue to segmentation. Even so, these properties could not be sufficient, since many morphemes are not preceded by open juncture, as, for example, the -s in books, shoes, runs, and socks.

As discussed earlier, the frequency of a morpheme may also contribute to a child's being able to identify it. This helps us understand how a child might identify some grammatical morphemes which are not preceded by open junctures. Evidence that both juncture and frequency play important roles in segmentation can be found in children's errors. High frequency morphological combinations that are not separated by juncture, such as he's, I'm, don't, and wanna, are often mis-segmented by children. In Brown's longitudinal study of three children's acquisition of English, each child made segmentation errors with just such combinations, that is, they produced utterances such as Its went, Its has wheels, and Its hurts (Brown et al. 1968). Having discovered a morpheme, the children's next task is to discover rules governing its use. Sometimes, however, they must discover that alternate forms are related.

The form problem. In most of the world's languages, some morphemes have more than one form. These are termed *allomorphs* of a morpheme. The English plural -s is a classic example. Some of its allomorphs assume the form they do because of the sound which precedes them: /s/ occurs after voiceless stops such as k and t (rakes, pots); /z/ occurs after voiced stops such as g and b (dogs, tabs). These are referred to as *phonologically conditioned allomorphs* because their occurrence can be predicted by a neighboring sound. Some of the allomorphs of the plural morpheme cannot be predicted phonologically, however. Consider child, for example, which has children as its plural, not childs. Similar cases include sheep→sheep, ox→oxen, and die→dice. This latter type of allomorph is termed *morphologically conditioned*, that is, one can only predict the plural of these forms by knowing the particular word.

The English past tense poses problems similar to that of the plural: walk→walked (the /t/ allomorph), shove→shoved (the /d/ allomorph), but eat→ate, is→was, and go→went. These examples illustrate that one of the major accomplishments in learning morphology is the discovery of alternate forms of some morphemes.

There is cross-cultural support for several stages in the acquisition of a morpheme with allomorphs (Slobin 1973 and MacWhinney 1978). At first, a child expresses the meaning of a morpheme without any overt encoding. Evidence for the meaning can be determined by the immediate linguistic and non-linguistic context. Thus, a child's initial attempt at expressing the meaning carried by the past tense morpheme, for example, will be through an uninflected verb, e.g., break, run. MacWhinney describes this as "inflections emerge semantically before they emerge morphologically (70)."

The next step is the appearance of the irregular allomorphs, such as mice, ate, and broke (Ervin 1964 and Slobin 1971). However, it does not appear that children have actually analyzed these forms morphologically as past tense. Instead, a

factor such as frequency in speech may account for their early appearance (Kuczaj 1977). Park (1978) suggests that where morphological rules are particularly opaque, as in the case of words with irregular alternate forms, a child initially uses some forms as the result of rote memorization. Rote learning rather than true analysis would then account for this stage.

Even stronger evidence that these irregular forms are unanalyzed comes from the next stage of development, where the regular inflections are used on both regular and irregular forms, e.g., tops, footses/feetses, or pushed, goed (Ervin 1964). Kuczaj (1977) suggests that during this period children may recognize that some of the irregular past tense forms are indeed an expression of past time, but they may not have connected the irregular past tense to the present tense forms. In other words, they may know that went refers to the past but not realize that it is the past tense form of go. Thus, they may not produce wented but will produce goed. Kuczaj's data show that the irregular verb + ed forms (goed) are much more frequent than the irregular past + -ed (ated), which tends to support this claim.

The final stage consists of sorting out the irregular from the regular past tense forms. This does not occur all at once, but gradually takes shape in a child's morphological system.

The form-meaning problem. In the previous section we observed that children are able to talk about things even though they may not yet have acquired the appropriate linguistic form. This is a widespread phenomenon in language development observed in the acquisition of words by using one word to refer to many things (Clark 1978) and in the development of complex relations through the juxtaposition of elements to mean more than either individually, e.g., Susan school for Susan is at school (Bloom 1970 and Bowerman 1974). Undoubtedly, the drive to communicate leads children to make maximum use of their available linguistic resources.

There is evidence to suggest that in general children first express a meaning without the presence of the full adult form. This is typically accomplished by juxtaposing existing content words such as nouns and verbs without the appropriate relational forms. For example, Cromer (1968) found that children's first attempts to talk about the past involved using present tense forms (I go school) to mean I went to school). Similarly, children talk about possession long before they begin using the possessive -'s. This is accomplished by taking existing forms and juxtaposing the possessor and the possessed (Adam chair) (Brown 1973). These examples suggest that a child takes an existing form, albeit incorrect, and assigns it a new meaning.

The general course of development is for children to expand their repertoire by adding forms and meanings; children take an existing form and give it additional meaning (Antinucci and Miller 1976). Similarly, having established a new category of meaning using an old form, they will search for a new form for that meaning. Drawing on Werner and Kaplan (1963), Slobin (1973) has referred to this process as *old forms for new functions and new forms for old functions*. This process makes a good deal of sense, enabling children to talk about their world before they have acquired the appropriate linguistic form.

Another aspect of the form-meaning problem is semantic limits on the range of forms to which a particular morpheme can be attached. Consider the progressive morpheme -ing. In English, dynamic verbs can take the progressive suffix, whereas stative verbs cannot.[13] This can be seen below.

(5) John is running to the end of the road.
(6) The little girl was looking at the huge elephant with surprise.
(7) He was always breaking things in stores.
(8) *His mother is believing his answers.[14]
(9) *I am knowing him very well.
(10) *They are needing mittens.
(11) *It is costing $1.50.
(12) *I am owing you a favor.
(13) *The book is belonging to me.

Note that (5)-(9) refer to *actions*, while (10)-(13) refer to *states*.

Similarly, the dynamic-stative distinction accounts for other non-occurrences

such as the absence of certain kinds of imperatives, e.g.,

(14) *Cost $400!
(15) *Need some sleep![15]

One of the interesting features of children's initial use of stative verbs is that they do not seem to make the mistake of misapplying the progressive (Brown 1973). The absence of error makes the acquisition of the progressive unlike the acquisition of the past tense morpheme (Slobin 1971b and Kuczaj 1977). However, learning the rules for the progressive differs from the past tense, since it does not entail discovering which of a series of alternate forms with the same meaning is applied to a particular word. Rather, a child must determine the set of verbs to which this particular morpheme does not apply at all, making this a considerably different sort of problem.

An explanation of this may lie in the semantics of the class of verbs to which the progressive can be attached. Children may be prepared to make this distinction as a result of their previous linguistic and non-linguistic experience. It must be recalled that from the earliest months of life, children pay attention to the dynamic features of their environment, and that this eventually turns up in their earliest word choices. Similarly, Bloom (1978) observes that the first dimension along which children distinguish verbs is activity. She found that children encode action events in multi-word utterances before state events are similarly encoded (Bloom et al. 1975). That is, children elaborate the syntax of their system with action verbs first. Thus, it seems reasonable that this would have consequence for the acquisition of morphology, in this case the -ing. (See Kuczaj 1978 for a different view.)

In sum, we have seen that children learning morphology must make several major discoveries: there are (1) alternate forms with the identical meaning (the allomorph problem), (2) alternate meanings for a particular form, and (3) limits on the application of a morpheme.

Learning about Syntax

The acquisition of morphology also interfaces with the acquisition of syntax. This interaction begins our discussion of the development of syntax. The object here is to obtain a general view of the relationship between morphology and a particular feature of syntax, the order of words, and then consider how their relationship might influence language learning.

The relationship between morphology and syntax. Although all languages use morphology and word order to express conceptual relations, they tend to differ in the extent to which they use each. For example, English tends to rely on word order to express many relations, whereas in the example below, Russian uses morphology.[16]

ENGLISH The dog chases the cat.

RUSSIAN Sobaka presledujet koshku.

In English the subject and object of a sentence are signalled by word order: the first noun is the subject and the second is the object. In Russian, this relation is expressed morphologically. The subject noun has the suffix -a, the inflection for feminine noun subjects, while the object noun has the feminine object suffix -u. In English if we change the place of the words dog and cat, the result is a sentence with an entirely different meaning. In contrast, a change in word order in the Russian sentence would leave the roles of the nouns and the meaning of the sentence essentially unchanged.

ENGLISH The cat chases the dog.

RUSSIAN Koshku presledujet sobaka.
'The dog chases the cat.'

Does the system a language uses for expressing a particular relation influence the ease with which children learn that relation? Recent research by Slobin suggests that it may. In a cross-cultural investigation, Slobin (1978) examined the native acquisition of English, Italian, Serbo-Croatian, and Turkish. In one study, he explored children's interpretations of sentences with two nouns and a verb, e.g., The horse chased the cow. He found that Turkish children were able to interpret these sentences reliably at a younger age than their English, Italian, or Yugoslav counterparts. He suggests that this difference in performance may be due to the ways in which the four languages express the subject-object relation. Slobin points out that in a language like Turkish, the grammatical roles of subject and object are expressed by clear case inflections. Thus, when Turkish children hear a noun, they can immediately determine its role in the sentence. In contrast, languages which employ word order to express these relations require that children listen to the entire sentence before they can determine which noun is the subject and which is the object. This seems to account for the slower acquisition in English, Italian, and Serbo-Croatian. Thus, the linguistic system a language uses for expressing these relations seems to influence the ease with which a child discovers the system. Moreover, these results point out that children learning English are faced with a somewhat more difficult task than children from a language which employs morphological devices as a principle method for expressing certain grammatical relations.

The general problems children must confront during their acquisition of English syntax are sketched below.

Coordinating morphemes of different words. As indicated in the preceding section, learning the meaning of a particular morpheme is only one part of the task of acquiring morphology. Another equally important problem is learning to coordinate morphemes of different words. Since this necessarily involves a relation between words, it falls within the domain of syntax.

One type of coordination between morphemes of different words is *agreement*. This relation occurs when the form of two words shares some grammatical property. Consider the following:

(16)a The boy goes
b The boys go
(17)a He is running.
b They are running.

Notice that when the subject of the sentence is singular, as in the *a* sentences above, the verb assumes a particular form (goes/is running); when the subject is plural, as in the *b* sentences, the verb changes form (go/are running). That is, number is signalled both on the subject and the verb. Although the way in which number is expressed may not be the same, i.e. no affix (a zero [Ø] affix) on boy, -s on go; -s on boy and Ø affix on go, nevertheless there are alternations on both forms. These simultaneous alternations expressing the same grammatical relation (here number) are examples of agreement.

Similarly, numerals and other forms that quantify objects in English agree in number with the nouns they modify, e.g., *one* book , *twelve* books, *some* cookies. Another example of agreement in English is found between a pronoun and its antecedent, that is, the noun to which it refers. For example, if reference is made to a person and one subsequently refers to a possession or activity related to that person, the pronoun must agree in gender with the gender of the noun, e.g., *John* went to get *his* suitcase. Observe that an error in pronoun choice would result in a sentence with an entirely different meaning, e.g., *John* went to get *her* suitcase.

The description above points out that agreement occurs at two different locations in utterances: within a constituent (*two* shoes) and between constituents (*They were* running). In some cases, agreement between constituents is more difficult for a child to master than agreement within a constituent. Consider the following: The dogs *are* chasing the rabbit. The agreement in terms of number here, between the subject (the dogs) and the verb (are running), is a coordination between two constituents of two different morphological classes, nouns and verbs. As such, a child must draw on two different sets of morphological rules. This is in contrast to other types of between constituent agreement (*Those* are my crayons)

or within constituent agreement (*Those* crayons are blue), where agreement occurs between members of similar morphological classes.

Another feature of between constituent agreement that increases its complexity is that it may also involve the acquisition of syntactic relations. For example, forming agreement between the subject of a sentence and the verb entails recognition that there is a noun which functions as the grammatical subject and that this form must agree in number with the verb, e.g., *The kitten was taken* by the boys and not *The kitten *were taken* by the boys. This difference in complexity between types of agreement has consequences for the ease with which agreement rules are acquired. For example, in a longitudinal study of three children's speech, Cazden (1968) found that the noun plural occurred within a constituent (*some* crayons) before it was used in a coordination between constituents (these crayons *are* blue). Similarly, other studies have shown that children acquire noun plurals (big book*s*) before the third person singular present tense (he run*s*), and this no doubt also reflects the within-between contrast (Berko 1958, Brown 1973, and Menyuk 1963). That is to say, a child can learn to correctly apply the plural to a noun without reference to the verb form (I see the boys), whereas the verb affix results from the number of the subject noun. Thus, the coordination of morphemes may procede slowly, spreading from within grammatically related units to between them.

Word order. Learning the order of words is a basic component of the acquisition of syntax. Most investigators report that children's utterances preserve the word order of the language they are learning. In fact, Bowerman (1973) found that the relative frequency of different word orders in Finnish children's speech corresponds to that in the speech of their parents. Indeed, many of the earliest studies of English speaking children report that their speech corresponds strikingly to adult word order (Bloom 1970, Miller and Ervin 1964, and Brown 1973). A report by de Villiers and de Villiers (1973b) confirms this. As part of a study of 33 children between 19 and 38 months of age, they examined the relation between children's semantic intent and the word order in their utterances. They found only 15 of 347 multi-word utterances contained odd word order. Thus, there is considerable evidence for the correct word order even in early language learning.

Many investigators suggest that children's correct use of word order arises out of the structure of the child's thought processes (Slobin 1978). Bruner (1975) accounts for this in terms of the structure of mother-child interaction, while McNeill (1975) argues that children's use of word order arises naturally out of the structure of pre-linguistic sensory-motor activity.

More recent studies cast doubt on the view that children actually have knowledge of word order rules in their first two or three years (de Villiers and de Villiers 1974a). As we saw in the earlier discussion of children's interpretational strategies, young language learners appear to rely on many extra-linguistic cues that seem to result in the correct response to particular word orders despite an absence of true understanding. In a related report, de Villiers and de Villiers (1973b) found that children with an MLU of 1.0-1.5 did not rely on word order to interpret reversible active and passive sentences. Instead, they randomly chose either noun in the sentence as the agent.

A study by Braine (1976) on the word order of children's earliest multi-word utterances also casts doubt on children's early knowledge of word order. He found that in some cases children's use of stable word order was preceded by a period of flux characterized by unordered sequences of two words.[17] Similarly, in a study of English speaking children, Ramer (1976) found individual differences in word order variability.

However, since the majority of children's utterances do correspond to adult word order, and this does not seem to stem from their knowledge of word order rules, what could account for this? Years ago Brown and Bellugi (1964) suggested: "It is conceivable that the child 'intends' the meaning coded by his word orders and that when he preserves the word order of an adult sentence he does so because he wants to say what the order says. It is also possible that his brain works that way and that he has no comprehension of the semantic contrasts involved (cited in Bar-Adon and Leopold 1971:310)."

Evidence on the use of extra-linguistic strategies in contrast to the incorrect interpretation of semantically reversible sentences suggests that children may

indeed begin using correct word order long before they understand its significance. (See Slobin 1978 for cross-cultural evidence on this.) Exactly what children do know about word order at these early stages has been the subject of considerable debate (Bowerman 1973, Bloom et al. 1975, and Clark 1975) and will not be treated here. However, there does appear to be sufficient evidence to support an asymmetry between children's use and understanding of word order in the first few years of language learning.

Expanding utterance complexity. Several major developments follow the child's first word combinations. Children learn to elaborate their utterances in a number of ways. Here we will examine the development of relations between clauses rather than within them, since this represents a major step in linguistically coordinating complex ideas.

•Elaborating Noun Phrases. One of the major devices for elaborating noun phrases is the relative clause. This structure can be used to provide additional and more complex information about a particular noun than would be provided by mere modification by an adjective. This is clearly illustrated in the following:

(18) The little girl is here.
(19) The girl who went home was crying.

One of the important functions of relative clauses is to place certain information about a particular noun phrase in the background so that other information can be made more prominent. Compare the following:

(20) I saw that man yesterday. He left the book here.
(21) The man that I saw yesterday left the book here.

In (20) the information in both sentences is of equal prominence, i.e. neither is emphasized. In (21), however, the identifying information about the man is subordinated, making his leaving of the book more prominent. It is the relative clause which makes this foregrounding possible.

Relative clauses are not fully acquired during the pre-school years, and this is due in part to the complexities they present. As discussed above, relatives modify another noun in a sentence, either the subject or the object. Moreover, the subject or object of the sentence can function as the subject or object of a relative clause, e.g.

(22) The dog that chased the bird bit the rabbit.
(23) The dog that the bird chased bit the rabbit.
(24) The dog chased the bird that bit the rabbit.
(25) The dog chased the bird that the rabbit bit.

In (22) the subject, dog, of the main clause is also the subject of the relative clause; however, in (23) it is the object of the relative clause. In (24) the object of the main clause, bird, is the subject of the relative clause, but it is the object of the relative clause in (25).

A major task in learning the structure of a sentence with a relative clause is to identify the noun phrase to which the relative clause refers. Since the relative clause is adjacent to the noun phrase it modifies, this narrows somewhat the set of problems a child must solve. However, another problem a child faces is discovering that a noun phrase may have one function in the main clause and a different function in the relative clause (as in (23) and (24) above). That is to say, the function of the modified noun and the relative pronoun may be the same or it may be different. Sheldon (1974) has referred to this as (the presence or absence of) parallel function.

Another feature of relative clauses which makes them difficult is that their word order may differ from the dominant word order in English (Legum 1975). For example, in sentences (22) and (24), the relative pronoun is the subject of the relative clause, and the order of the constituents in the clause is subject, verb, object (SVO), e.g.

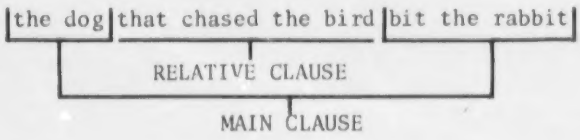
that chased the bird
S V O

This is the order of elements in English simple sentences. In contrast, the word order in the relative clauses in (23) and (25) differs from simple sentences--instead it is OSV as seen below.

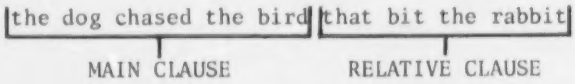
that the bird chased
O S V

That is, the relative pronoun is the object of the relative clause.

A third potential source of difficulty in learning relatives is the placement of the relative clause (Hakuta 1976). In (22) and (23) the relative clause interrupts the main clause, e.g.



However, in (24) and (25) the main clause is uninterrupted, as seen below.



In fact, Slobin (1973) has suggested that children have difficulty processing interrupted sequences. We saw evidence of this earlier in the acquisition of discontinuous morphemes. Thus, this same factor may apply to the acquisition of relative clauses.

A fourth factor that may play a role in the development of relative clauses is the function of the noun phrase that is modified by the relative clause (Slobin 1971a). In (22) and (23) above, the modified noun phrase is the subject of the main clause, whereas in (24) and (25) the object of the main clause is modified.

One difficulty in untangling the effect of these factors is that pairs of factors vary together.[15] This can be seen in the relationship between locus of interruption and function of the modified noun, which vary simultaneously. In (22) and (23) the main clause is interrupted and the modified noun is the subject of the main clause; in (24) and (25) the main clause is not interrupted, and the modified noun is the object of the main clause.

There has been considerable disagreement over the effect of these factors. Aside from the difficulties in resolving this cited above, there is evidence to suggest that these factors may have varying influences at different ages. For example, Sheldon (1977 and 1979) compared her 1974 research on relative clauses conducted with four- and five-year-olds to a study done with six- to eight-year-olds (Legum 1975). Both investigators found that their subjects performed at significantly higher levels on sentences with parallel function [(22) and (25)] than without parallel function [(23) and (24)]. However, Legum found that the older children did better on sentences that contained relative clauses with "normal" word order (SVO) than on sentences where the relative clauses had altered order (OVS). Thus, the effect of word order alternations may increase with age.

Although we have considered only one type of noun phrase elaboration, it illustrates some of the more difficult problems children encounter in the course of expanding their repertoire of devices for modifying nouns. Next we examine some of the developments in the elaboration of verb phrases.

•Elaborating Verb Phrases. One means of elaborating the verb phrase is the addition of auxiliaries, e.g., can, could, be, have, shall, may: this is expansion within the verb itself. Another type of elaboration, termed *complementation*, is the addition of different types of clauses which "complete" the meaning of the verb.

Consider the following sentences.

(26) I want her to run.
(27) He said she's very happy.
(28) Bob heard that Jane left for Rio.
(29) She never heard what he said.

In each sentence the complement (underlined above) completes the meaning of the verb.

Limber (1973) reports that the first type of clausal verb complement to occur in children's speech is object noun phrase complements, e.g., I don't want *you read that book*; I see *you sit down*. This development is followed by complements introduced by pronouns, e.g., Do it *how I do it*; I show (you) *what I got*. In a related study, Bloom et al. (1978) examined the acquisition of sentence connection using explicit connectives. They found that verb complementation first occurred in constructions not taking explicit syntactic connectives, i.e. those with certain verbs such as see, tell, and want (I want *man stand up*). This was followed later by the use of forms with a connective (I don't know *what her name is*; Tell Iris *that I wet my bed*).

Thus, verb complementation developed initially without explicit syntactic connection; the use of pronouns to introduce complements appeared later. The pattern is similar to the development of inflections in that the semantic content preceded the appearance of the adult form to express the meaning.

•Connecting Clauses: Cases other than Complementation. Another major mechanism for relating pieces of information in clauses is coordination and subordination. In coordination two clauses of equal status and function are linked together; in subordination there is an asymmetrical relationship between the two. Both of these devices represent a major development in children's language learning in that they learn to explicitly express the relationship between two complex pieces of information represented in the two clauses. Moreover, they represent another means of foregrounding information and are thus related to relative clauses in this way. As such, it is not surprising that they are a later development than the juxtaposition of sentences (Bowerman 1974 and Clancy et al. 1976).

The acquisition of coordination begins earlier than subordination (Clark 1973a, Hood et al. 1978, and Keller-Cohen 1979). An account of this probably lies in the requirements for using the two: in coordinating propositions a child need not be able to determine the relative importance of either piece of information, whereas this is necessary in subordination. Moreover, a child does not have to plan out the structure of a coordinate sentence, since the two clauses are merely chained together. In contrast, the relationship between the information in the clauses in subordination must be determined in advance at least in some cases. For example, in sentences where the subordinate clause comes first (Before they left, they had dinner), a child must have pre-established which piece of information was superordinate in order to produce the subordinate clause first. Indeed, studies of children's use of subordinate clauses describing time and order suggest that sentences with the main clause first (The boy opened the door when he finished) are used at a younger age than subordinate clause first sentences (Before he finished, he opened the door) (Clark 1973a). The planning necessary to produce subordinate clause first sentences would seem to place a greater burden on a child than coordinate or subordinate clause second sentences.

We have looked briefly at several types of complex sentences: conjoined (subordination and coordination), complements, and relatives. Bloom et al. (1978) found that children acquired these complex structures in just that order: conjunction< complementation<relativization. They suggest several factors which might account for this development. However, one in particular seems to be of central importance. The acquisition of conjunction does not entail learning to use pronominal forms which are required in some complements and relative clauses. Pronominalization places particular demands on the child insofar as it requires that a child link one form with an antecedent structure. This difference may be basic to the later acquisition of structures with these forms.

Movement rules. The preceding discussion points out some of the major difficulties in learning to make utterances more complex. The final section examines how children learn rules for rearranging elements in utterances. This last

development involves rules that move around particular elements of sentences. For example, in forming questions, the subject and verb auxiliary change places:

(30) You are going to school.
(31) Are you going to school?
(32) Where are you going?

Similarly, in passive sentences the object of the sentence is moved to the front and the subject is moved to the end and preceded by by:

(33) The elephant chased the tiger.
(34) The tiger was chased by the elephant.

There is wide support for the view that children are rather late in acquiring rules for sentences that require the rearrangement of elements. When children learn questions, their initial stages of development do not include inversions (Brown 1968 and Klima and Bellugi 1966). Their earliest questions are yes-no questions with rising intonation and no auxiliary, e.g., No ear?/See hole?, and Wh-questions without an auxiliary, e.g., Where Daddy going?/Why you smiling?

This same pattern has been observed in the acquisition of the passive. When children are presented with a semantically reversible passive (The cat was chased by the dog), they interpret it as The cat chased the dog[19] (Beilin 1975 and Maratsos and Abramovitch 1975). Similarly, children are late in using the passive in their speech (Maratsos 1978). The actual cause for the later acquisition of these forms is not clear. Slobin (1973) has suggested that children avoid using structures that require the rearrangement of elements. However, this is unlikely, since it is first necessary to show that children have knowledge of a particular structure before it can be said that they are avoiding use of it (Keller-Cohen 1978b). Instead, it seems likely that young children have rather limited knowledge of these inversions, and that this stems from their inability to detect arrangements (Maratsos forthcoming).

How, then, do children go about learning these movement rules? Apparently, they begin learning them in a rather limited set of structures, generalizing their rules to a wider range of environments over the course of development. For example, Labov and Labov (1976) examined the acquisition of questions in their daughter's speech. They found that inversion appeared first in yes-no questions (Is peaches bigger than apricots?) and was not present in Wh-questions (Why we can't wear sandals for walking in the woods?). A similar pattern is reported by Horgan (1978) for the acquisition of the passive. She examined children's use of passives in descriptions of pictures. The children were divided into three age groups--two-four, five-seven, and nine-thirteen years of age. Compared to adults, Horgan found that the youngest children used passives in a semantically restricted way, generally with by followed by an inanimate noun phrase, e.g., The lamp was broken by the ball; Choo choo train got crashed...by a bus. The frequent use of the agentive passive (The lamp was broken by the girl) did not occur until adulthood. Studies such as these indicate that children's first rules may differ greatly from those used by adults. At the start a child seems to formulate a rather limited hypothesis about the application of a rule, gradually expanding the sets of forms to which it can apply.

CONCLUSION

This article has sketched some of the formidible linguistic tasks children begin to tackle during the pre-school years. In particular, the discussion has focused on achievements that are the target of formal language instruction during the school years. It is hoped that the view which results will increase the reader's appreciation for the sorts of tasks with which children are confronted when they first learn a language, and the strategies they use along the way. Finally, some of the major characteristics of this process have been outlined so the origins of language development during the school years ultimately may be better understood.

FOOTNOTES

[1]Another variable, eye contact, was also included, but is not considered in the discussion presented here.

[2]This section does not discuss particular features of adults' speech to children that may influence language learning. For a thorough review of this see Snow and Ferguson (1977).

[3]This is related to Trevarthren's (1974) observation that infants display different patterns of body movements in response to humans in contrast to non-humans.

[4]*Phatic* is used to refer to devices which keep the channel of communication open such as huh, uh-huh.

[5]See Bowerman (1978) for related examples.

[6]It could be argued that the children simply went to the "not red one" or "not blue one." However, Carey reports that several children repeated the word chromium, apparently treating it as a new word, some even asking, "You mean this one?" So they seemed to have tagged it as a new, unfamiliar lexical item.

[7]This discussion is restricted primarily to the regularities of English morphological variations.

[8]For example, in Tagalog there is an infix--um--used to express past time, e.g., basag 'break,' bumasag 'broke,' sulat 'write,' sumulat 'wrote.'

[9]There are, of course, exceptions to this generalization.

[10]The children's previous experience with suffixes may in part account for his results.

[11]They learn the progressive -ing before they learn the full form is + ing.

[12]The accusative case has many functions, one of which is to indicate which noun is the grammatical object.

[13]In fact, in Italian this same contrast between dynamic and stative verbs shows up in differences in the past tense.

[14]* before a sentence indicates that the accompanying sentence is generally considered ungrammatical or unacceptable by native speakers.

[15]For other properties of this class of verbs see Quirk et al. (1972).

[16]Russian actually uses a combination of word order and morphology to express the relations *subject* and *object*. The gender of the noun will determine the extent to which word order plays a role.

[17]See Lightbown (1977) for a related report on word order variability in two French children's acquisition of their first language.

[18]See Hakuta (1976) for a study which attempts to pull apart the effects of interruption and the function of the modified noun phrase.

[19]See also the section on Strategies for Interpreting Words and Sentences, pp. 54-56.

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